Single Aisle
TECHNICAL TRAINING MANUAL
T1+T2 (IAE V2500) (Lvl 2&3)
INDICATING

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INDICATING

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EIS ARCHITECTURE (2)

EFIS-ECAM

The Electronic Instrument System (EIS) is shown on 6 identical Liquid Crystal Display (LCD) units and controlled through the EIS control panels. The Electronic Centralized Aircraft Monitoring (ECAM) displays are identical and controlled through the ECAM Control Panel (ECP). The Electronic Flight Instrument System (EFIS) displays are controlled by the EFIS control panels and the lighting/loudspeaker control panels.

DMC

The Display Management Computers (DMCs) are data concentrators and receive data from aircraft sensors and systems. They send them to the Display Units (DUs). The DUs compute and display the images on each unit. In normal operation DMC1 drives the CAPT Primary Flight Display (PFD), the CAPT Navigation Display (ND), Engine/Warning Display (EWD) and System Display (SD). In normal operation DMC 2 drives the F/O PFD and ND DUs. If DMC 1 fails, it is automatically replaced by DMC 2 for ECAM only. DMC 2 cannot drive the CAPT PFD and ND; a manual switching to DMC 3 is required. DMC 3 can drive any of the six DUs. DMC 3 is a hot spare awaiting the failure of DMC 1 or 2 and can be switched to drive the DUs linked to the failed DMC.
Data loading of the DMC 1 is possible with Portable Data Loader (PDL).

FWC

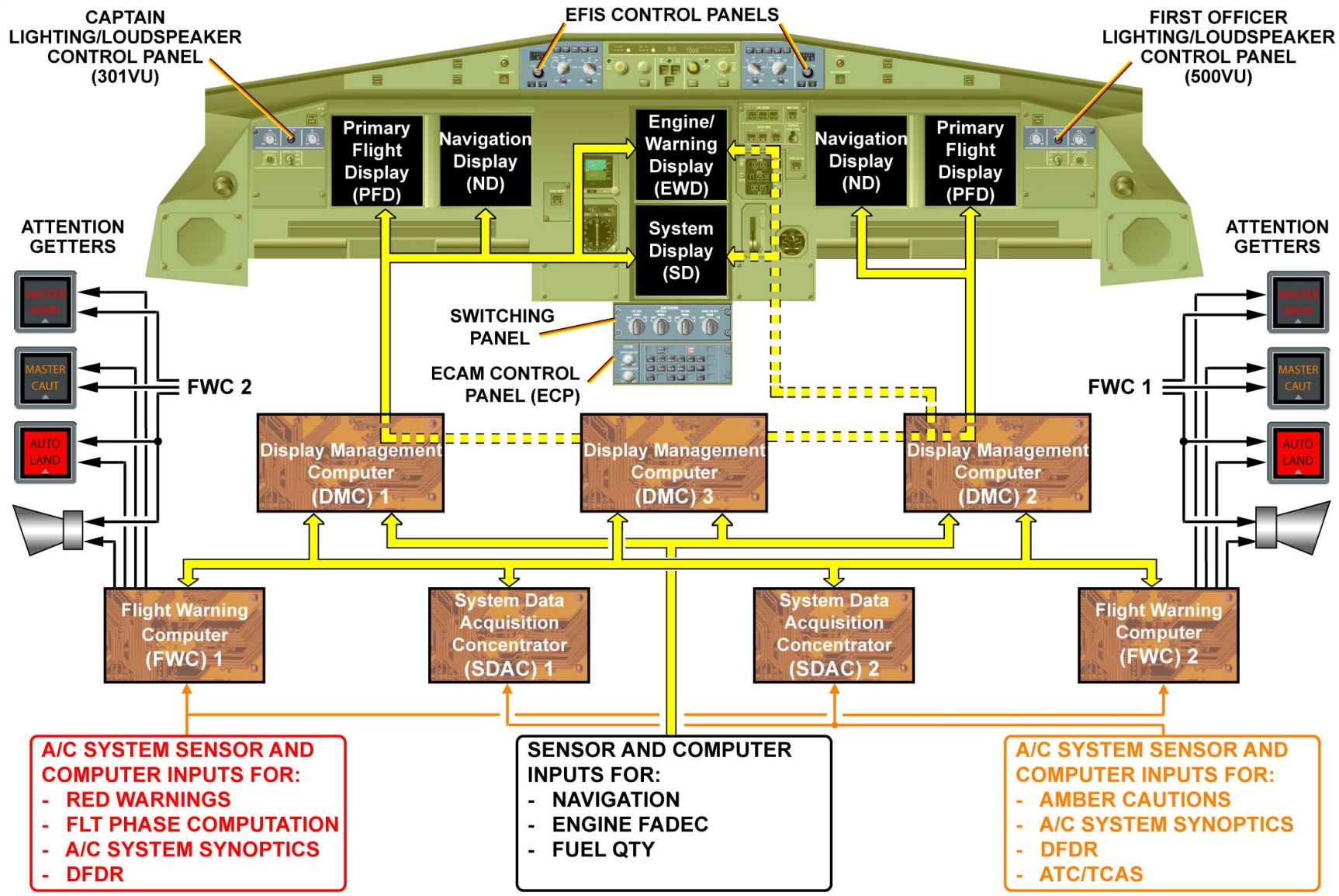
The Flight Warning Computers (FWCs) monitor the aircraft systems. Each FWC generates all warning and caution messages, supplies the attention getters, computes the flight phase and provides aural warnings.

SDAC

The System Data Acquisition Concentrators (SDACs) receive various signals from the aircraft systems and send them to the FWCs and to the DMCs.

INPUTS

The inputs received by the FWC are used to elaborate red warnings. Various items of information for systems like engines, fuel, navigation and which do not agree with a warning, are directly sent to the DMCs. The inputs received by the SDACs are used by the DMCs to display system pages and by the FWCs to generate most of amber warnings.



EFIS-ECAM ... INPUTS

EIS ARCHITECTURE (2)

COMPONENT LOCATION

The EIS computers are located in the aft avionics rack.

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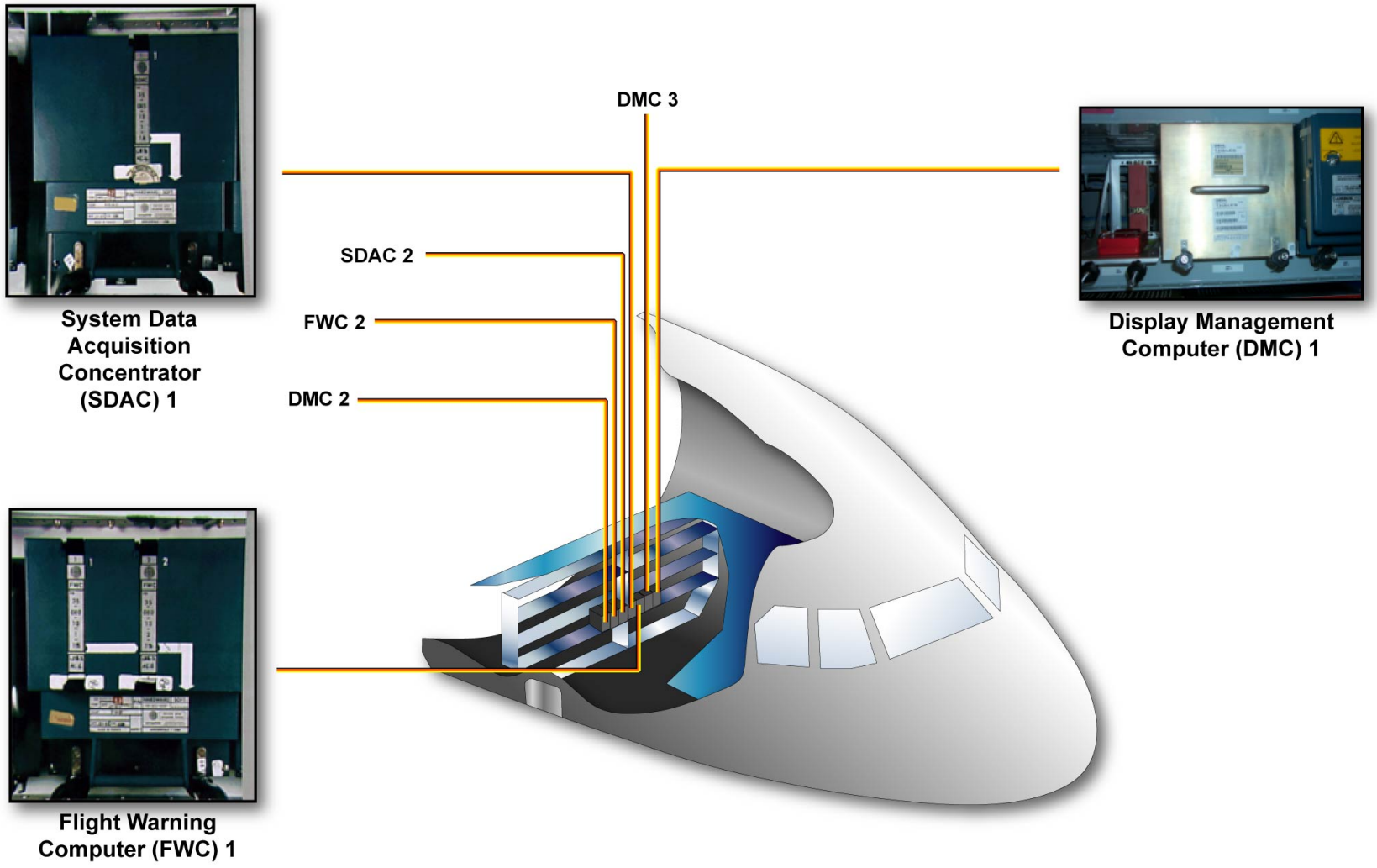

COMPONENT LOCATION

ENGINE/WARNING DISPLAY PRESENTATION (2)

GENERAL

The Engine/Warning Display (EWD) is normally on the upper Display Unit (DU), it is divided into upper and lower areas. The EWD is dedicated to the presentation of information.

EWD INFORMATION

On the upper area are permanently displayed:
- Primary engine parameters,
- Slat/flap position indication,
- Fuel On Board (FOB).

On the lower area are displayed:
- Memos, failure messages and actions to be performed. During TakeOff (TO) and landing, most of the warnings are inhibited.

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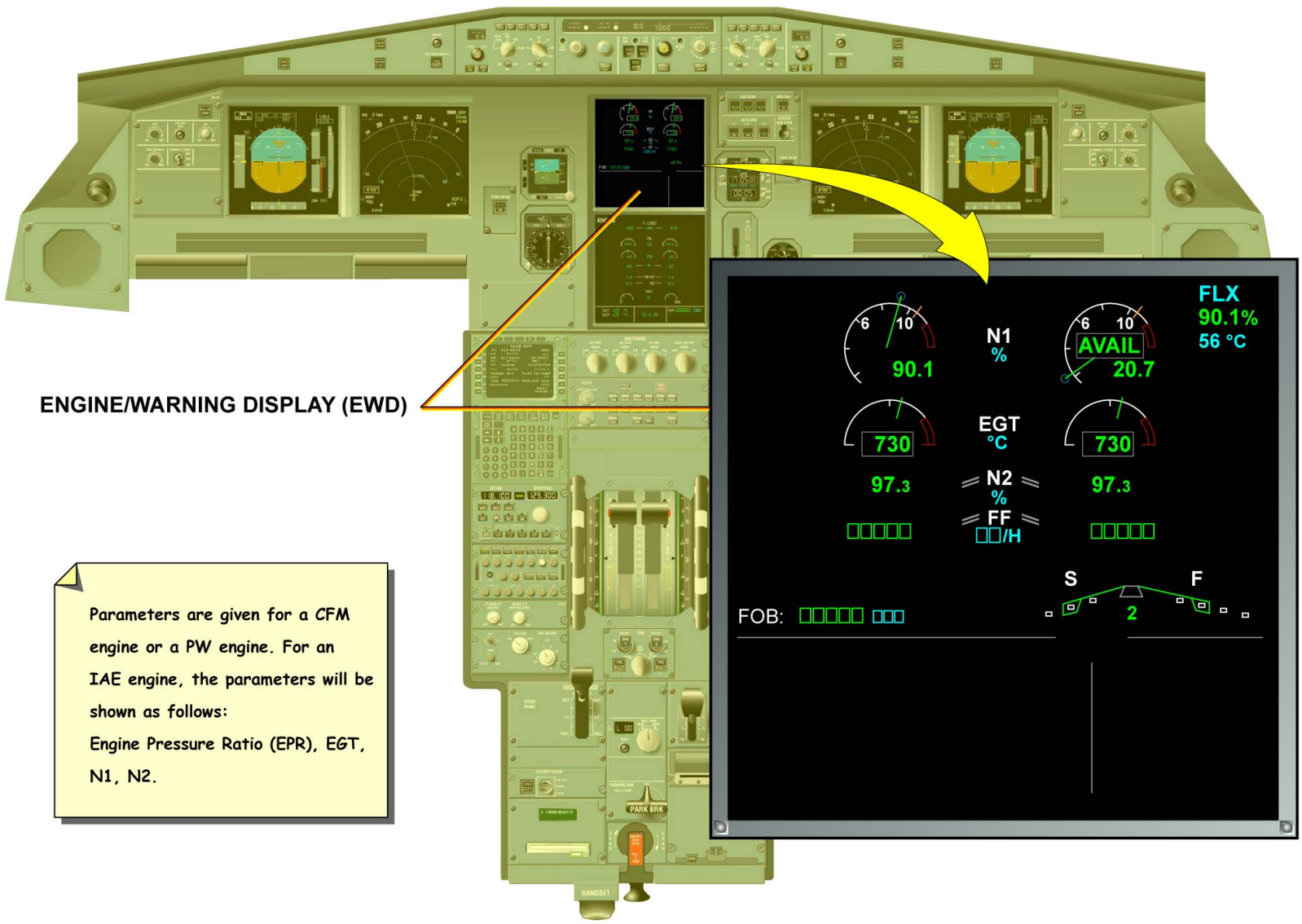


GENERAL - EWD INFORMATION

ENGINE/WARNING DISPLAY PRESENTATION (2)

ADVISORY AND STATUS INDICATION

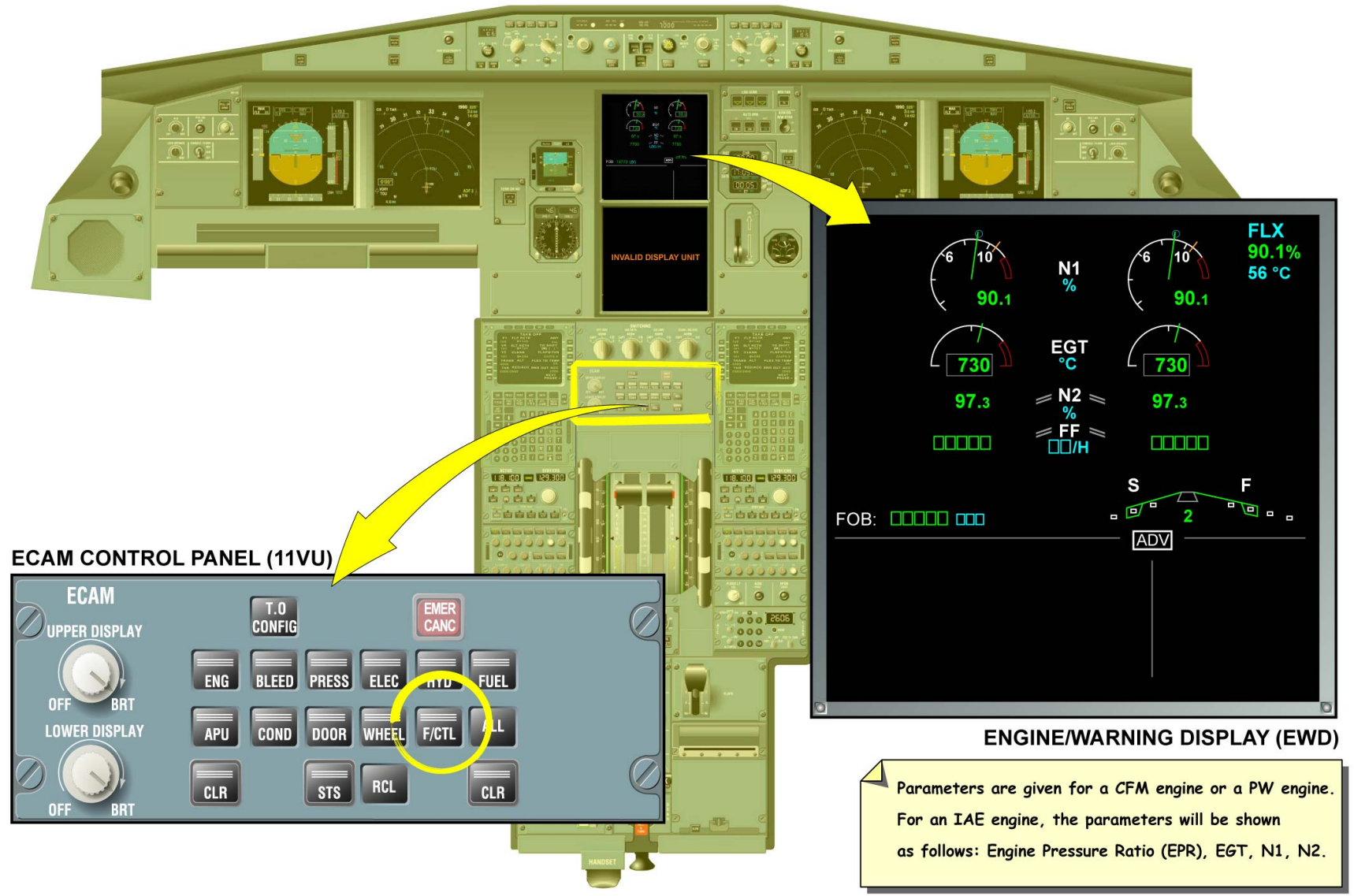
There are conditions when additional symbols are displayed, on the EWD lower area. The symbols are ADV (Advisory), STS (Status) and a green arrow (overflow).

ADVISORY INDICATION

The symbol Advisory (ADV) located on the lower part of the EWD is displayed with pulsing in the following cases:
- When the crew has performed a manual selection for a SD page and there is an advisory on another SD page.
- When a failure has been detected by the FWC and there is an advisory on another SD.
- When there are several advisories on several SD page. In this case, the SD page which contains the first detected advisory is displayed. However, ADV symbol will be pulsing in order to indicate to the crew that there are one or several advisories.

NOTE: Note: ADV indication is pulsing for both Dual and Single EWD display mode for EIS2.
For EIS1, ADV symbol is displayed with pulsing on the EWD, only for Mono Display mode when an advisory has been detected.

UGB13131 - U7ST0M0 - UM31P4000000001



ADVISORY AND STATUS INDICATION - ADVISORY INDICATION

ENGINE/WARNING DISPLAY PRESENTATION (2)

ADVISORY AND STATUS INDICATION (continued)

STATUS INDICATION

Status (STS) indicates that a status message is present on the SD STS page.

NOTE: Note: Status (STS) indication is not shown on the EWD when the status page is displayed on the lower ECAM DU.

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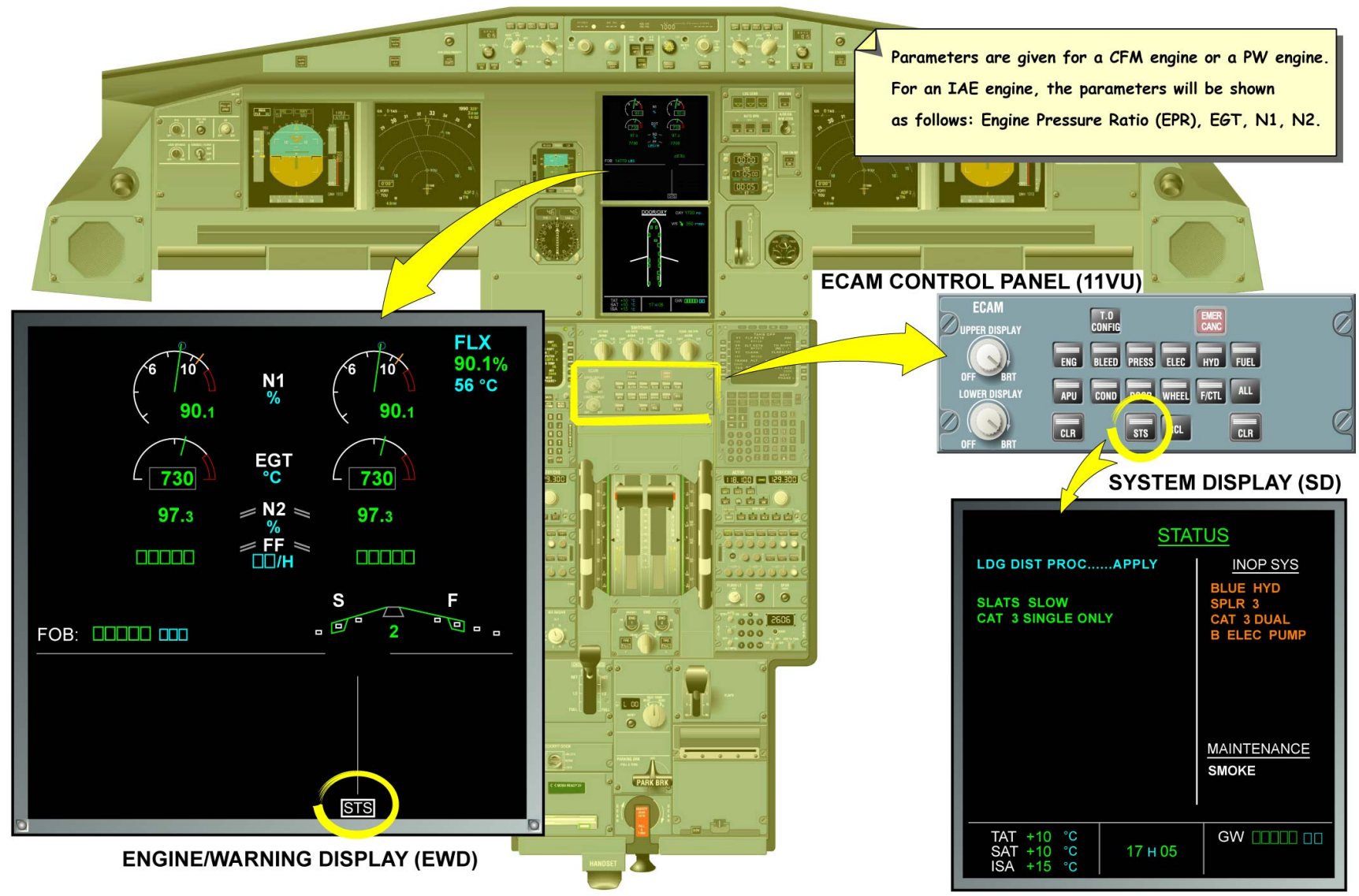

ADVISORY AND STATUS INDICATION - STATUS INDICATION

ENGINE/WARNING DISPLAY PRESENTATION (2)

ADVISORY AND STATUS INDICATION (continued)

ARROW INDICATION

The overflow arrow in green color indicates that warning messages exceed the capacity of the display on the left memo area.

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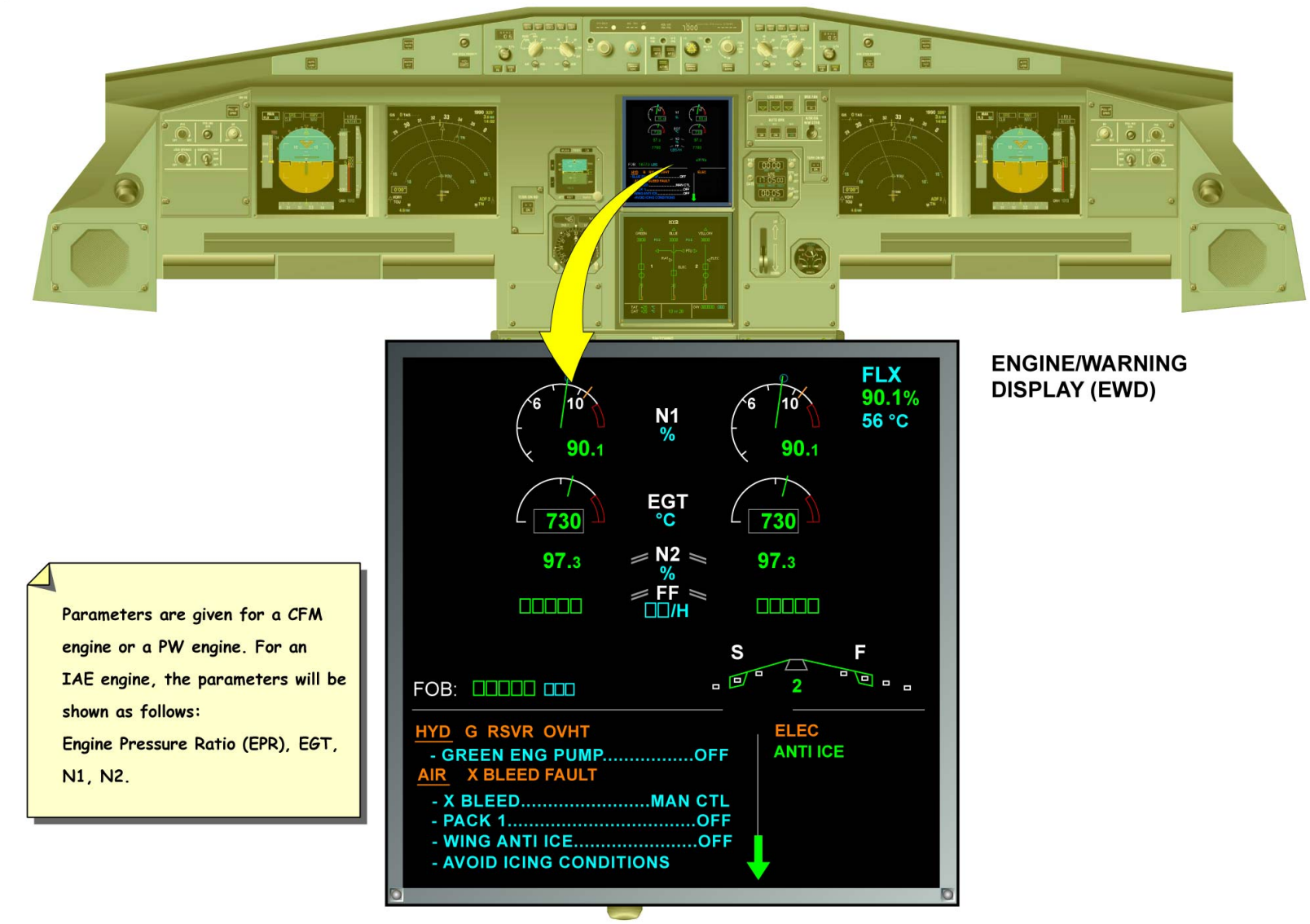


ADVISORY AND STATUS INDICATION - ARROW INDICATION

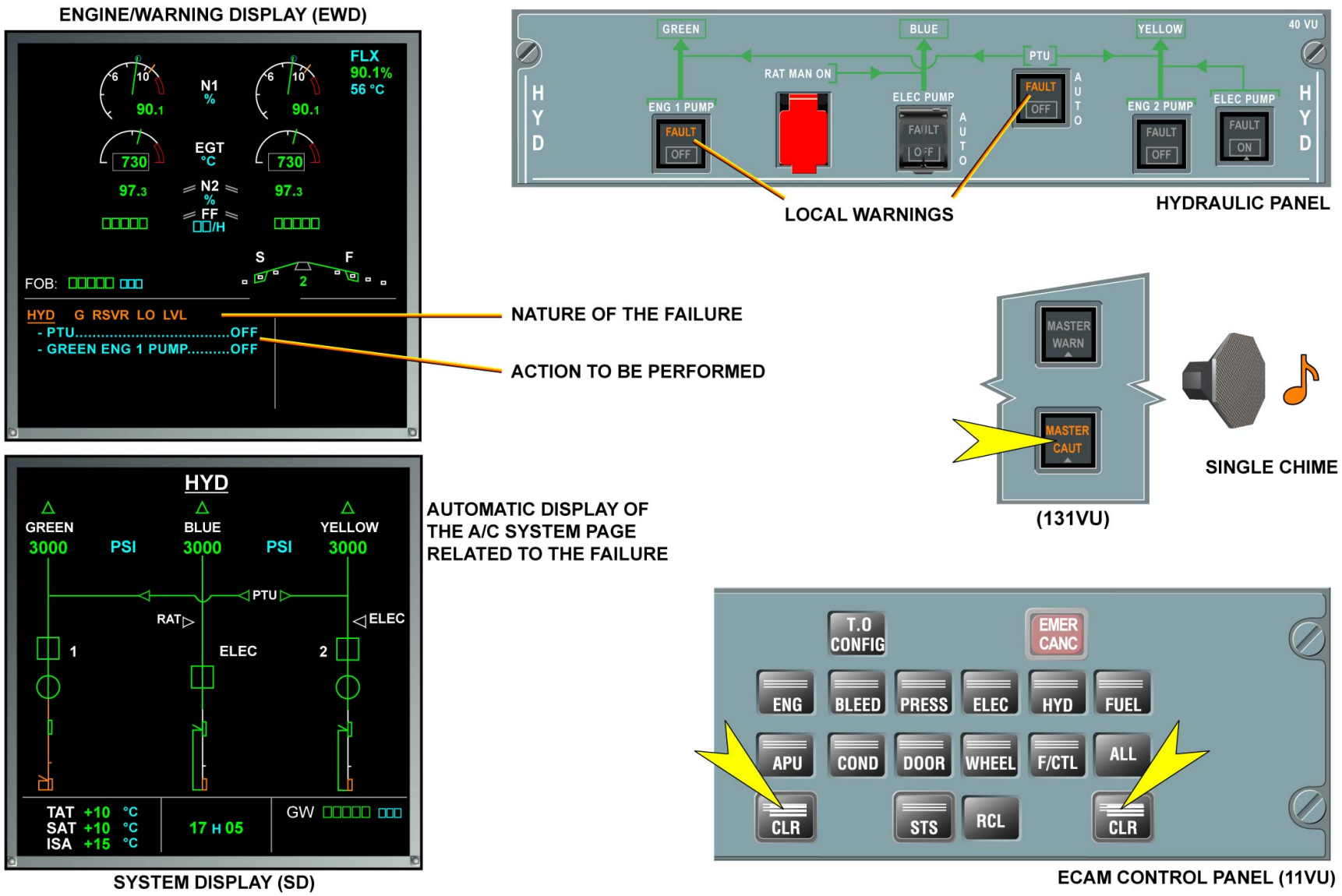
ECAM WARNINGS PRESENTATION (2)

ECAM DISPLAY WITH AIRCRAFT SYSTEM FAILURE

In case of aircraft system failure, an aural warning, the Single Chime (SC), a visual warning and the MASTER CAUTion, attract your attention. The Engine/Warning Display (EWD) indicates the title of the failure and the actions to take. On the status and System Display (SD), the hydraulic page is called automatically. The CLeaR P/Bs come on and as long as the failure is not cleared, they stay on. On the hydraulic panel the FAULT lights come on, indicating the P/Bs to release out.

NOTE: In this module, parameters are given for a CFM engine. For an IAE engine, the parameters will be shown as follows: Engine Pressure Ratio (EPR), EGT, N1 and N2). The graphics show an example of sequence of Electronic Centralized Aircraft Monitoring (ECAM) displays in case of green hydraulic system fault. This may be different to your aircraft configuration.

UGB13131 - U7ST0M0 - UM31P600000002



ECAM DISPLAY WITH AIRCRAFT SYSTEM FAILURE

ECAM WARNINGS PRESENTATION (2)

CREW CORRECTIVE ACTIONS

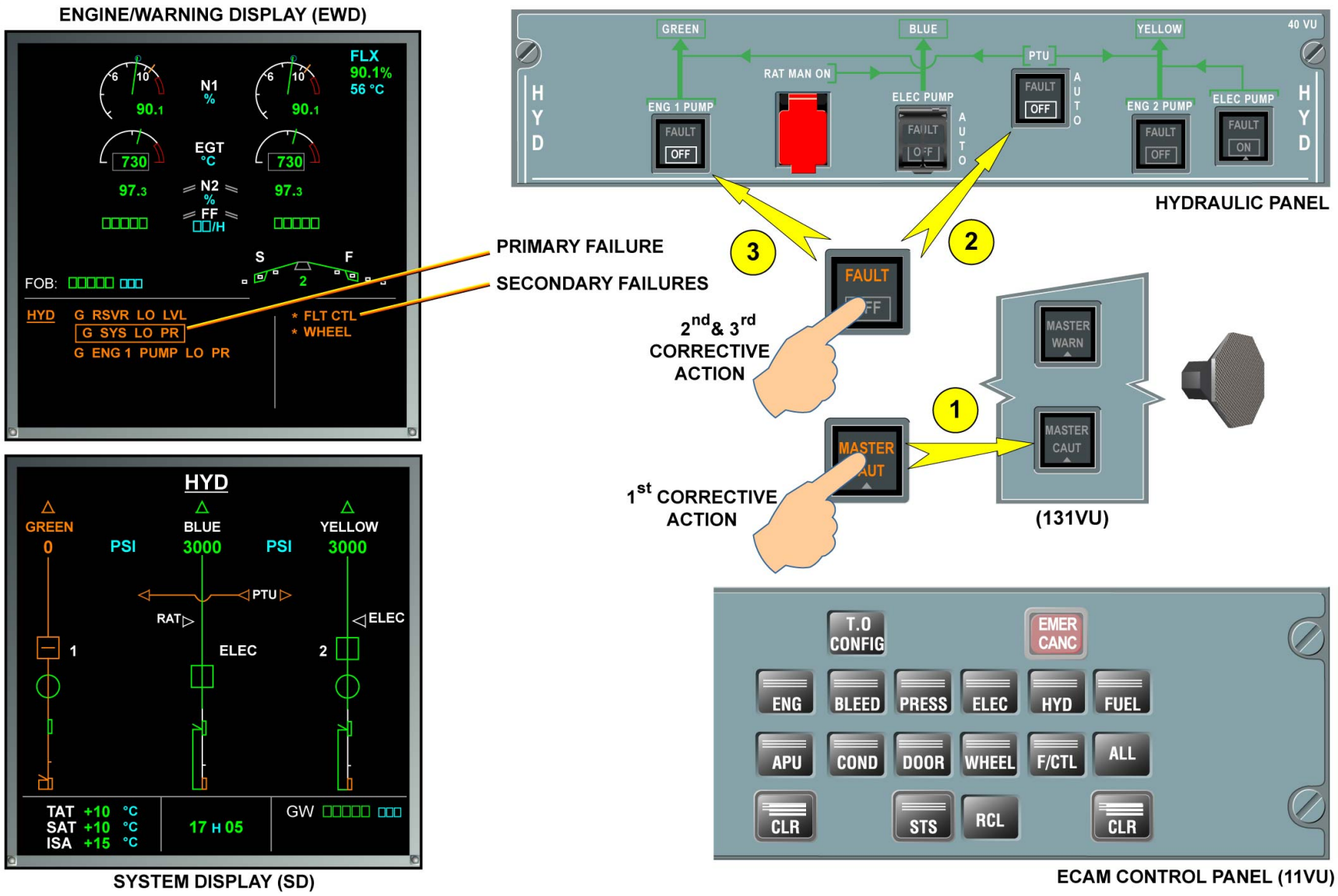
CORRECTIVE ACTIONS

When you press the MASTER CAUT, it goes off. Then, actions indicated on the EWD have to be done. First, switch OFF the Power Transfer Unit (PTU) P/B on the hydraulic panel, and then switch OFF the GREEN ENGine 1 PUMP P/B.

RESULTS

The corrective actions have been taken. All the FAULT lights are off. On the EWD, the messages associated to the corrective action have disappeared. On the left hand side of the EWD, the result of the failure appears indicating that it is a primary failure. On the right hand side, the secondary failures are displayed.

UGB13131 - U7ST0M0 - UM31P600000002



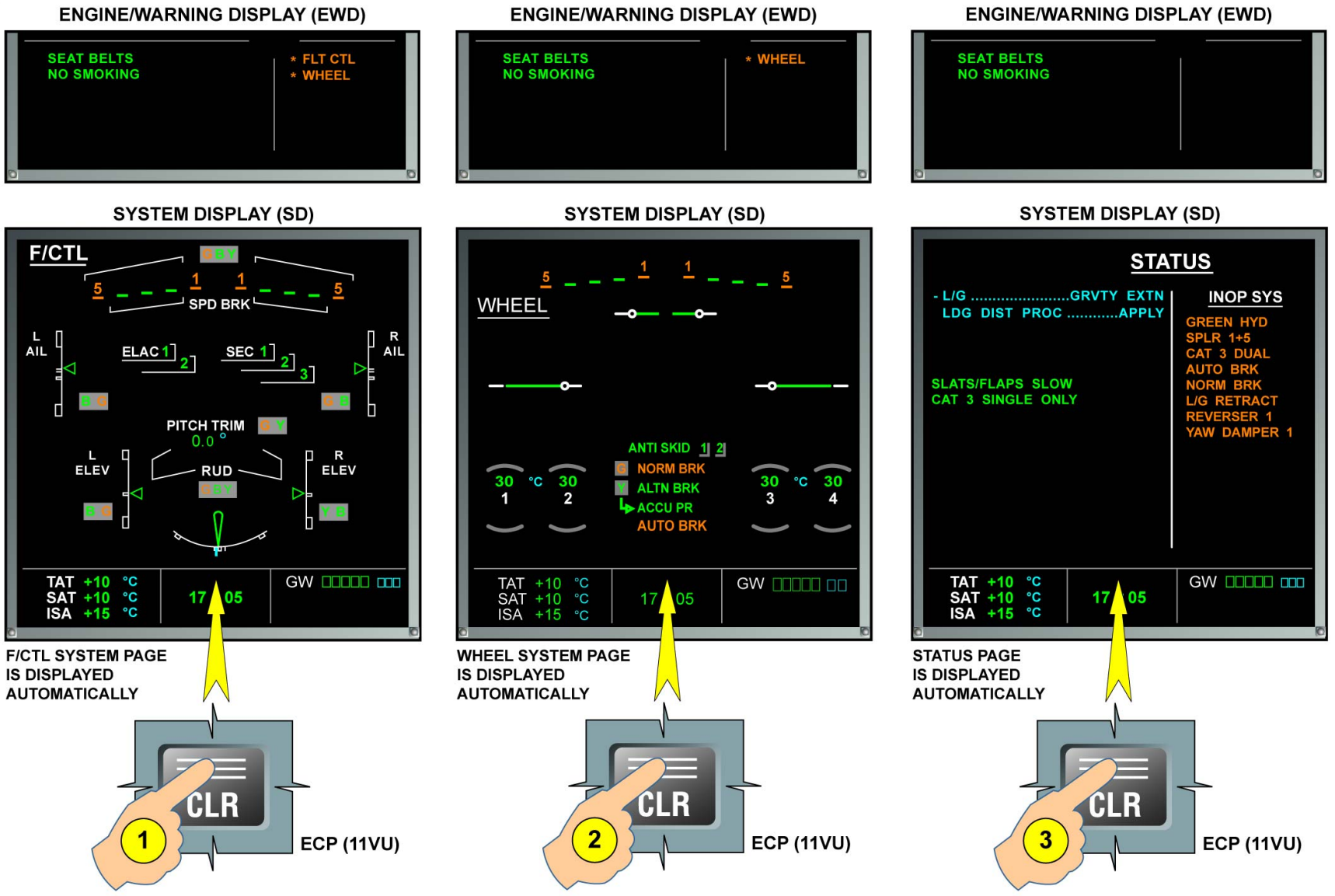
CREW CORRECTIVE ACTIONS - CORRECTIVE ACTIONS & RESULTS

ECAM WARNINGS PRESENTATION (2)

CLEARING OF THE WARNINGS

When you press CLR, on the left hand part of the EWD the title of the failure disappears and MEMO messages come back. The system page corresponding to the first secondary failure is displayed. When you press CLR again, the title of the first secondary failure disappears. The system page associated with the next secondary failure is displayed. When you press CLR a third time, the title of the secondary failure disappears. The MEMO message comes back on the right hand part of the EWD. The STATUS page is displayed.

UGB13131 - U7ST0M0 - UM31P600000002



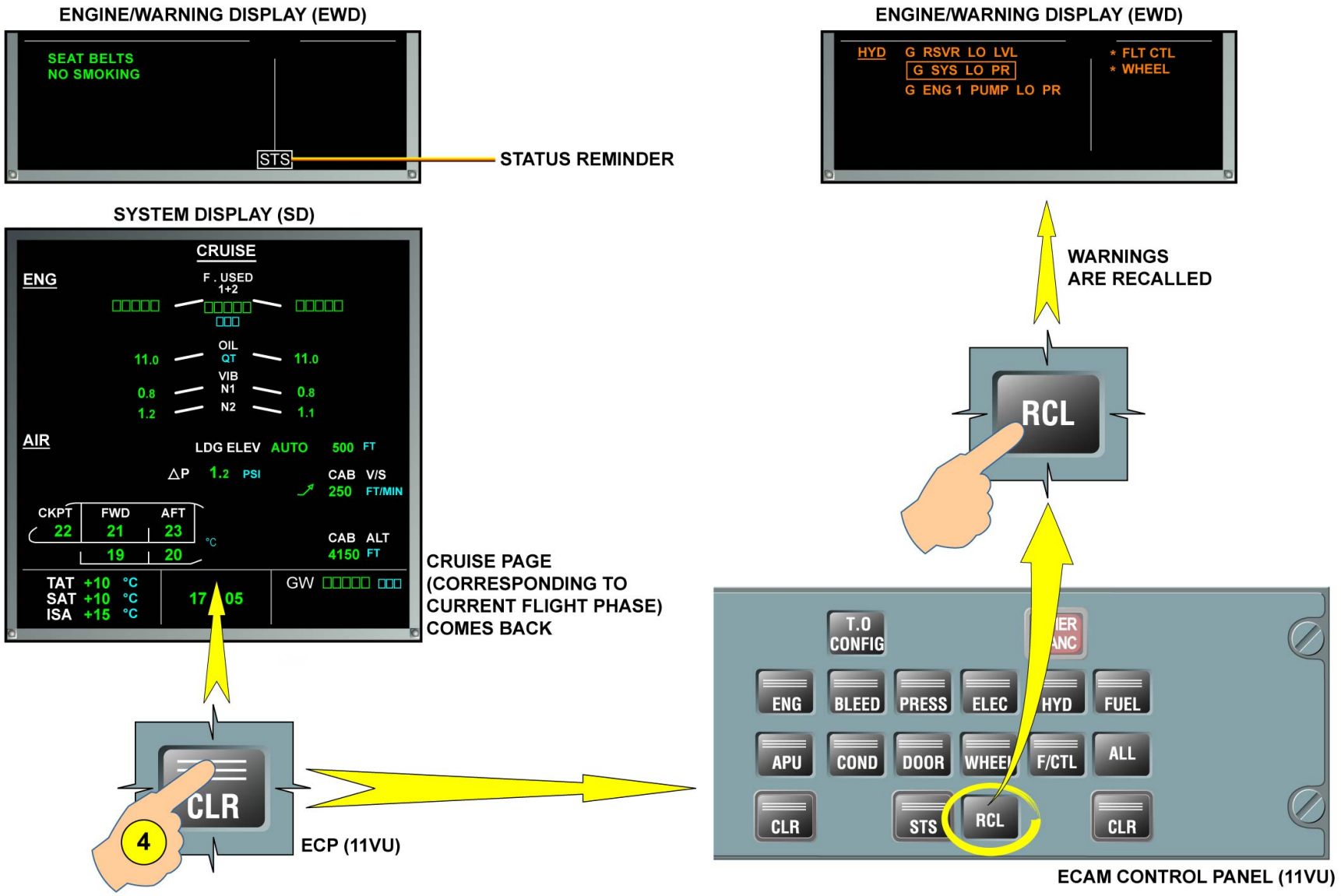
CLEARING OF THE WARNINGS

ECAM WARNINGS PRESENTATION (2)

STATUS REMINDER AND RECALL FUNCTION

When you press CLR a last time, the STATUS reminder STS on the EWD indicates that the STATUS page is not empty and the CLR P/Bs go off. On the status page, the cruise page (related to the present flight phase) comes back. The warning has been cleared. The ReCalL P/B lets the crew reactivate the Liquid Crystal Display (LCD) presentation of an alert inhibited either through the flight phase or by the CLR function.

UGB13131 - U7ST0M0 - UM31P600000002



STATUS REMINDER AND RECALL FUNCTION

INDICATING SYSTEM CONTROL & INDICATING (2)

EIS

WARNING PRESENTATION

CLOCK and ND CHRONO

CFDS MENU on GROUND

PFR PRESENTATION

UGB13131 - U7ST0M0 - UM31IZLEVEL0202

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UGB13131 - U7ST0M0 - UM31IZLEVEL0202

EIS ECAM NORMAL AND MANUAL MODE DESCRIPTION (3)

GENERAL

The Electronic Centralized Aircraft Monitoring (ECAM) gives to the flight crew the aircraft system displays. The ECAM shows data on two Liquid Crystal Display (LCD) units, the upper ECAM is the Engine/Warning Display (EWD) and the lower ECAM is the System Display (SD). These LCDs are fully interchangeable.

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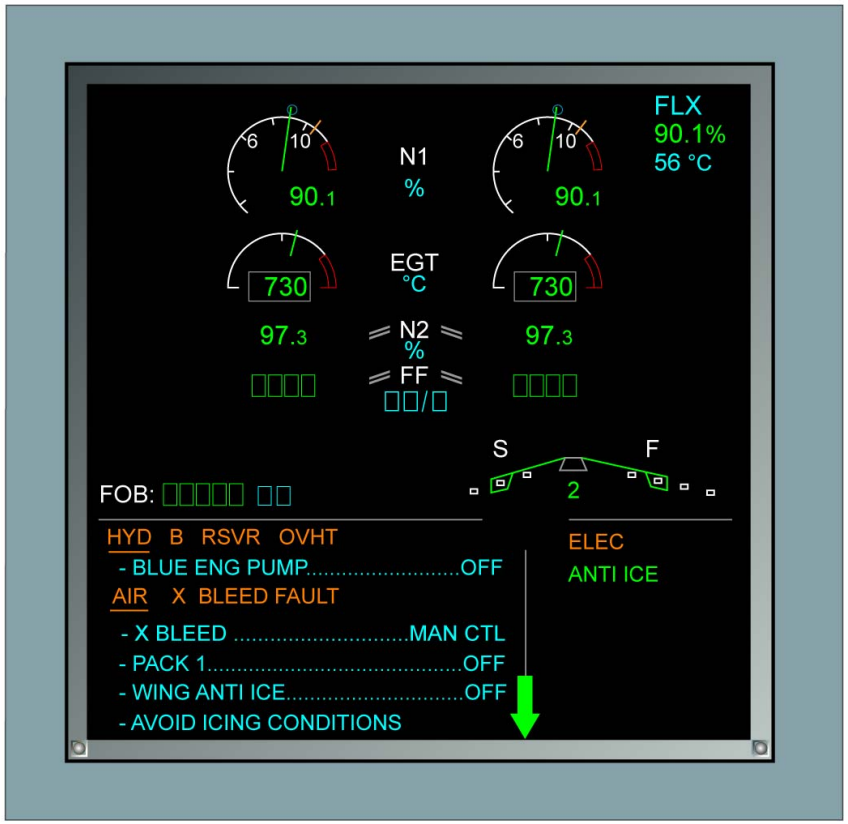


ENGINE/WARNING DISPLAY (EWD)

SYSTEM DISPLAY (SD)

These ECAM pages are shown with an A320, CFM engines with metric units. These displays are shown as examples.

GENERAL

EIS ECAM NORMAL AND MANUAL MODE DESCRIPTION (3)

ENGINE/WARNING DISPLAY PRESENTATION

The EWD gives the essential data necessary to monitor engine parameters, warnings, cautions, checklist, and memos to the flight crew. The upper area is related to engine primary parameters, fuel on board and slat/flat position. These parameters are given in analog and/or digital form.
The lower area is dedicated to warning/caution and memo messages. Warnings and memos are automatically generated by the Flight Warning Computer (FWC). The left memo area is dedicated to warnings and cautions (primary or independent failures) or memo information related to procedural pilot actions or memo information. The right memo area is dedicated to the system affected by a warning or a caution (secondary failure) or memo information related to the phase inhibition (takeoff and landing only) or temporary pilot actions (ANTI ICE ON) or special lines (AP OFF).

UGB13131 - U7ST0M0 - UM31DH000000001

ENGINE/WARNING DISPLAY (EWD)

These ECAM pages are shown with an A320, CFM engines with metric units. These displays are shown as examples.

ENGINE/WARNING DISPLAY PRESENTATION

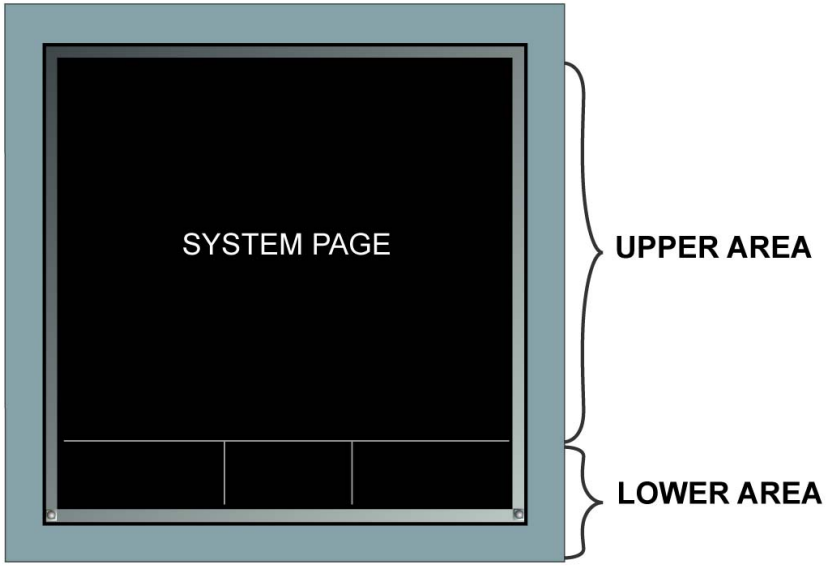
EIS ECAM NORMAL AND MANUAL MODE DESCRIPTION (3)

SYSTEM DISPLAY PRESENTATION

The SD is divided into 2 areas:
- the upper area displays system or status pages,
- the lower area is dedicated to permanent data.

The SD can display one of 11 system pages, cruise page or status page.
In normal operation, the SD automatically shows the system pages according to the current flight phase. Nevertheless manual page selection is always possible. The CRUISE page is automatically displayed in flight (no manual selection). It displays the main system parameters to monitor during the flight. Priority is given to automatic display.
The status page is an operational summary of the current aircraft condition.
The information is displayed at the end of an ECAM procedure or upon crew request.
The status page includes:
- the limitation, approach procedures, information and cancelled cautions are displayed in the left column,
- the inoperative systems below the caption "INOP SYS" and any class 2 system failure below the caption "MAINTENANCE" are displayed in the right column.

At the bottom of the SD, below the grey line is the permanent data. It is always displayed whatever system page is present.
Total Air Temperature (TAT) and Static Air Temperature (SAT) are digital values. International Standard Atmosphere (ISA) is in fact a delta ISA indication that appears only in standard barometric reference mode only. The captions (TAT, SAT, ISA, GW) are displayed in white and the units in cyan. The values are normally displayed in green.
Load factor (G LOAD) is only displayed amber when the value is above 1.4 G or below 0.7 G for more than 2 seconds. The information remains in view for 5 seconds, when the excessive condition has disappeared.
The display of the load factor is inhibited during flight phases 1 & 2.Feedback to the flight crew by providing system messages can also be displayed in amber above or below the time indication. In case of degraded value, last 2 digits are dashed, in case of No Computed Data (NCD), 3 blues dashes replaces the values (on ground).
Status, advisory and overflow are indications on the display.
The advisory (ADV), appears by pulsing in white to indicate that an aircraft system parameter has drifted out of its normal operating range.
In ECAM single display mode, the related page pushbutton will also flash on the ECAM Control Panel (ECP) to indicate to the crew which system page is affected by an advisory.
The status (STS) indicates that a status message is on the ECAM status page. It appears below the grey stripe at the same location as the overflow arrow provided that this one is away. This message indicates to the pilot that the status page is no more empty.
The overflow arrow indicates that the warning messages exceed the capacity of the display on the left memo area (7 lines). In this case, the heading titles of the warning messages are displayed on the right memo area.

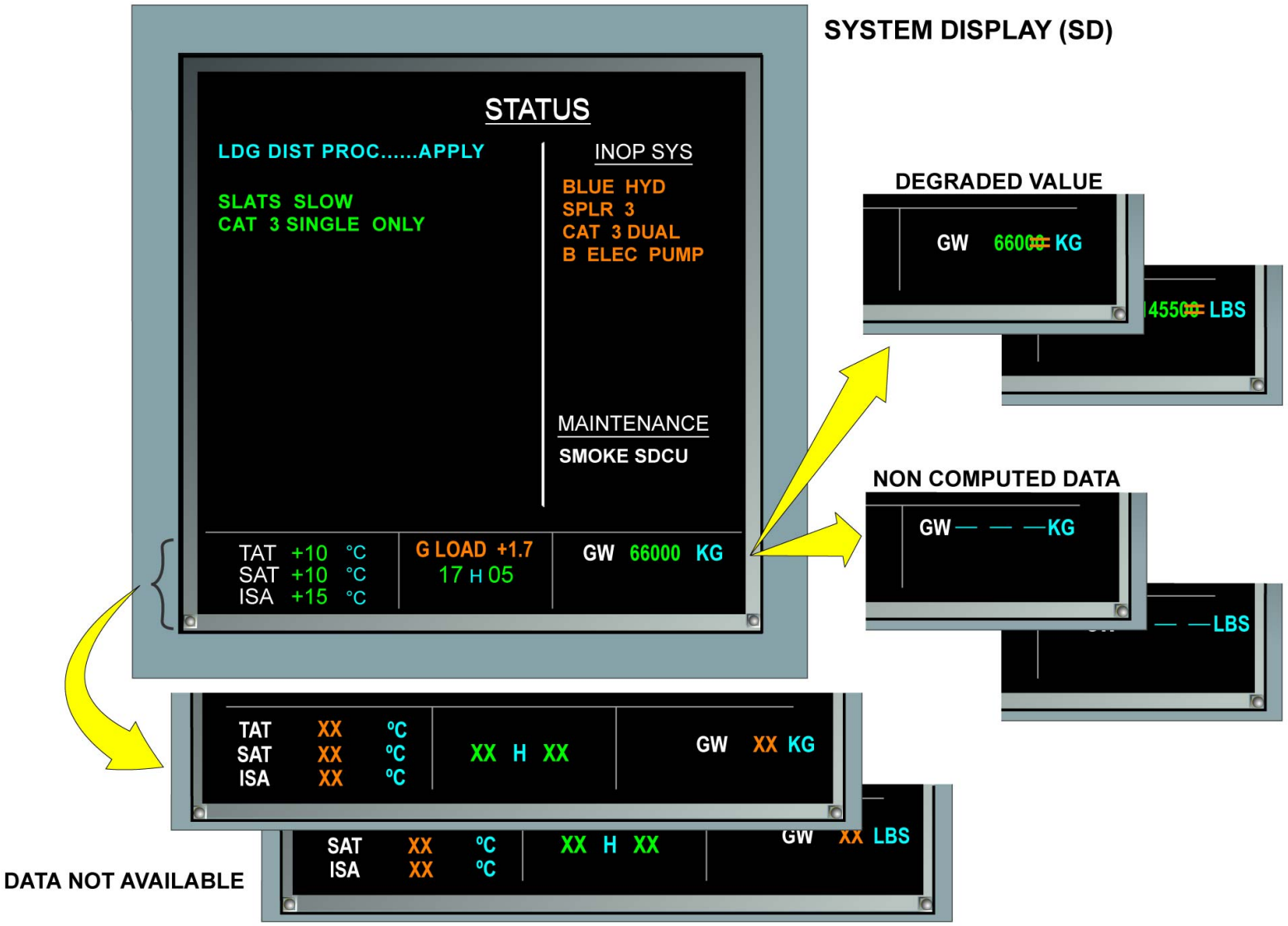


The 11 system pages are:

- Air Bleed (BLEED),
- Air Conditioning (COND),
- Cabin Pressurization (CAB PRESS),
- Electrical Power Supply (ELEC),
- Flight Controls (F/CTL),
- Fuel (FUEL),
- Hydraulic Power (HYD),
- APU (APU),
- Engine Secondary Parameters (ENGINE),
- Door and Oxygen (DOOR/OXY),
- Landing Gear, Wheels, Brakes (WHEEL).

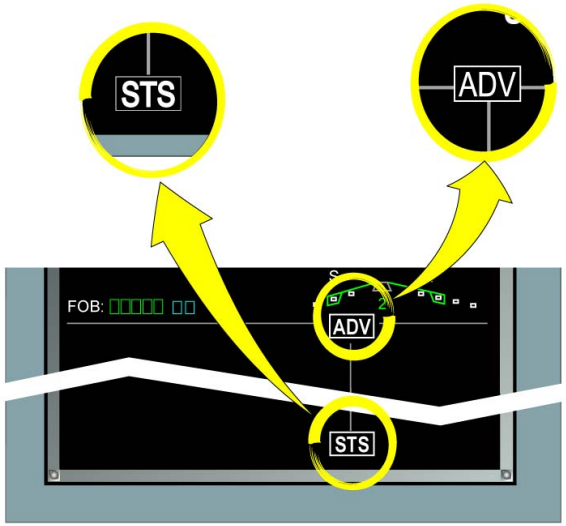
These ECAM pages are shown with an A320, CFM engines with metric units.
These displays are shown as examples.

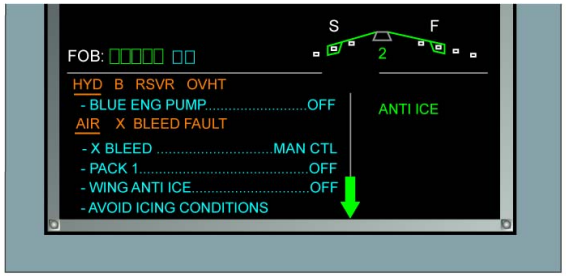
SYSTEM DISPLAY PRESENTATION



SYSTEM DISPLAY PRESENTATION

ENGINE/WARNING DISPLAY (EWD)





These ECAM pages are shown with an A320, CFM engines with metric units. These displays are shown as examples.

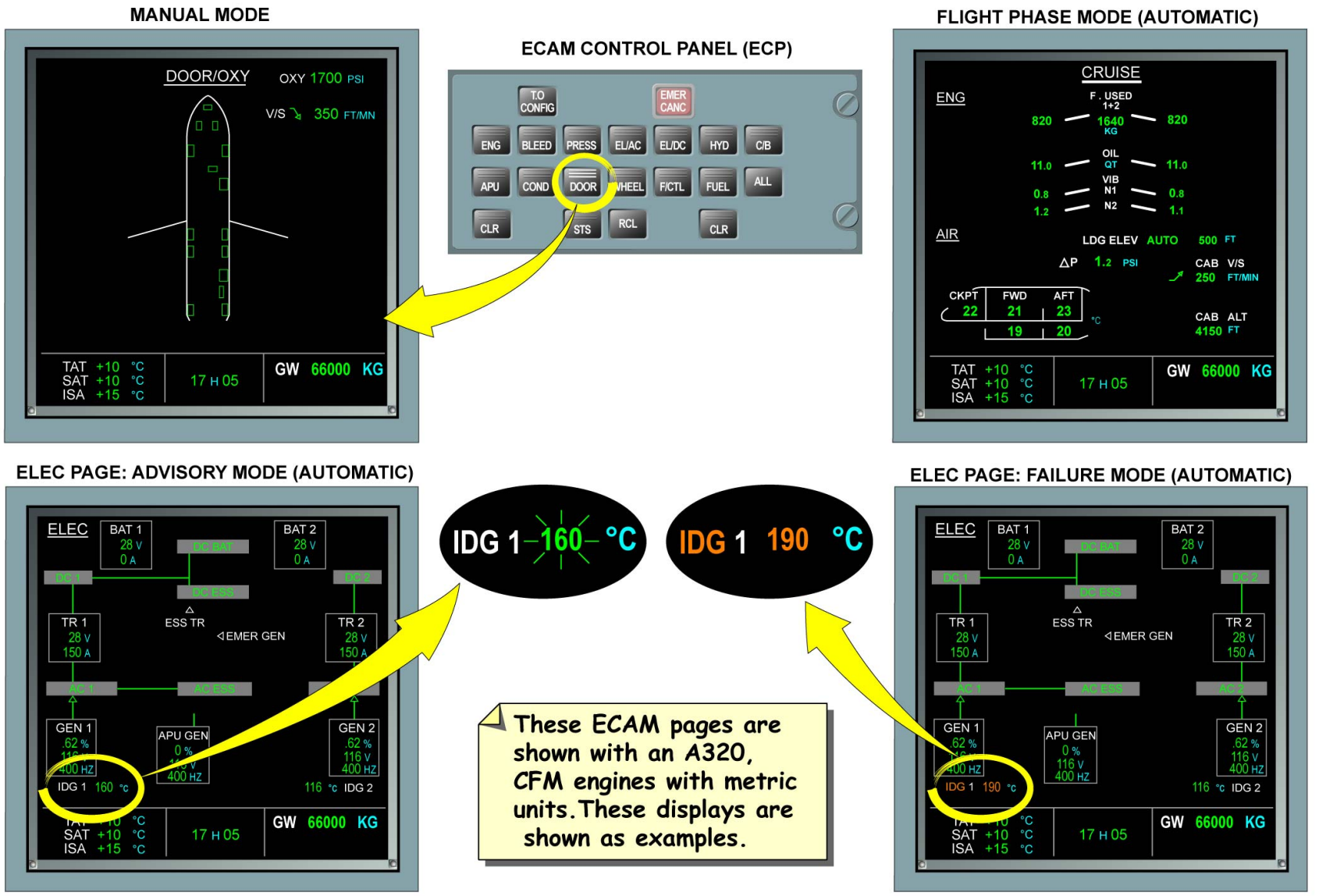
SYSTEM DISPLAY PRESENTATION

EIS ECAM NORMAL AND MANUAL MODE DESCRIPTION (3)

ECAM MODES

The ECAM operates in four modes for the system page presentation with a priority order:
- the normal mode according to the flight phase is automatically presented in case of an aircraft configuration change,
- the failure mode is automatically presented when warning/caution is triggered,
- the advisory mode is automatically presented when a parameter is drifting,
- the manual mode, through the ECP.

NOTE: Note that the manual mode is cancelled in case of a warning or an advisory.


MANUAL MODE
DOOR/OXY
OXY 1700 PSI
V/S 350 FT/MN
TAT +10 °C
SAT +10 °C
ISA +15 °C
17 H 05
GW 66000 KG
ECAM CONTROL PANEL (ECP)
T.O CONFIG
EMER CANC
ENG
BLEED
PRESS
EL/AC
EL/DC
HYD
C/B
APU
COND
DOOR
WHEEL
F/CTL
FUEL
ALL
CLR
STS
RCL
CLR
FLIGHT PHASE MODE (AUTOMATIC)
CRUISE
ENG
F . USED 1+2
820
1640 KG
820
OIL QT
11.0
11.0
VIB N1
0.8
0.8
N2
1.2
1.1
AIR
LDG ELEV AUTO 500 FT
ΔP 1.2 PSI
CAB V/S 250 FT/MIN
CKPT 22
FWD 21
AFT 23
19
20
°C
CAB ALT 4150 FT
TAT +10 °C
SAT +10 °C
ISA +15 °C
17 H 05
GW 66000 KG
ELEC PAGE: ADVISORY MODE (AUTOMATIC)
ELEC
BAT 1 28 V 0 A
BAT 2 28 V 0 A
DC BAT
DC 1
DC 2
DC ESS
ESS TR
EMER GEN
TR 1 28 V 150 A
TR 2 28 V 150 A
AC 1
AC ESS
AC 2
GEN 1 .62 % 400 HZ
APU GEN 0 % 400 HZ
GEN 2 .62 % 116 V 400 HZ
IDG 1 160 °C
116 °C IDG 2
TAT +10 °C
SAT +10 °C
ISA +15 °C
17 H 05
GW 66000 KG
IDG 1 160 °C
IDG 1 190 °C
ELEC PAGE: FAILURE MODE (AUTOMATIC)
ELEC
BAT 1 28 V 0 A
BAT 2 28 V 0 A
DC BAT
DC 1
DC 2
DC ESS
ESS TR
EMER GEN
TR 1 28 V 150 A
TR 2 28 V 150 A
AC 1
AC ESS
AC 2
GEN 1 .62 % 400 HZ
APU GEN 0 % 116 V 400 HZ
GEN 2 .62 % 116 V 400 HZ
IDG 1 190 °C
116 °C IDG 2
TAT +10 °C
SAT +10 °C
ISA +15 °C
17 H 05
GW 66000 KG
These ECAM pages are shown with an A320, CFM engines with metric units. These displays are shown as examples.

ECAM MODES

EIS ECAM NORMAL AND MANUAL MODE DESCRIPTION (3)

ECAM MODES (continued)

AUTOMATIC MODE

In normal operation the ECAM system pages are displayed according to the current flight phase, this mode is called automatic mode. A flight is divided into 10 phases corresponding to an aircraft configuration change. These flight phases are generated by the FWC and used by the Display Units (DUs) to automatically call up the system pages.

DOOR (phase 1)

The APU or engine pages are displayed in priority if the APU or the engines are started, in any flight phase.
The APU page appears when APU master switch is switched ON. It disappears when APU master switch is switched OFF or the APU RPM is above 95% for 10 seconds.
The ENGINE page appears at the beginning of the start sequence, and disappears 10 seconds after this start sequence.

WHEEL (phase 2)

The WHEEL page is displayed only after the engine start has been completed, and the Engine Start switch is returned to the Normal position.
The FLighT ConTroL page replaces the WHEEL page for 20 seconds when either sidestick is moved or when rudder deflection is above 22 degrees.

ENGINE (phase 3,4,5)

During these phases, most warnings are inhibited.
TO INHIBIT is displayed on the right memo area of the EWD.

CRUISE (phase 6)

The CRUISE page appears as soon as the slats are retracted and the engines are not at take off power, provided that the landing gear is retracted. The TO INHIBIT message disappears. The CRUISE page disappears when the landing gear is selected down and ALT below 16000ft.

WHEEL (phase 7,8,9)

During these phases, most warnings are inhibited.
"LDG INHIBIT" is displayed on the right memo area of the EWD.
"LDG INHIBIT" message disappears (flight phase 9).

DOOR (phase 10)

Five minutes after the last engine shutdown the FWC starts a new flight leg at phase 1.

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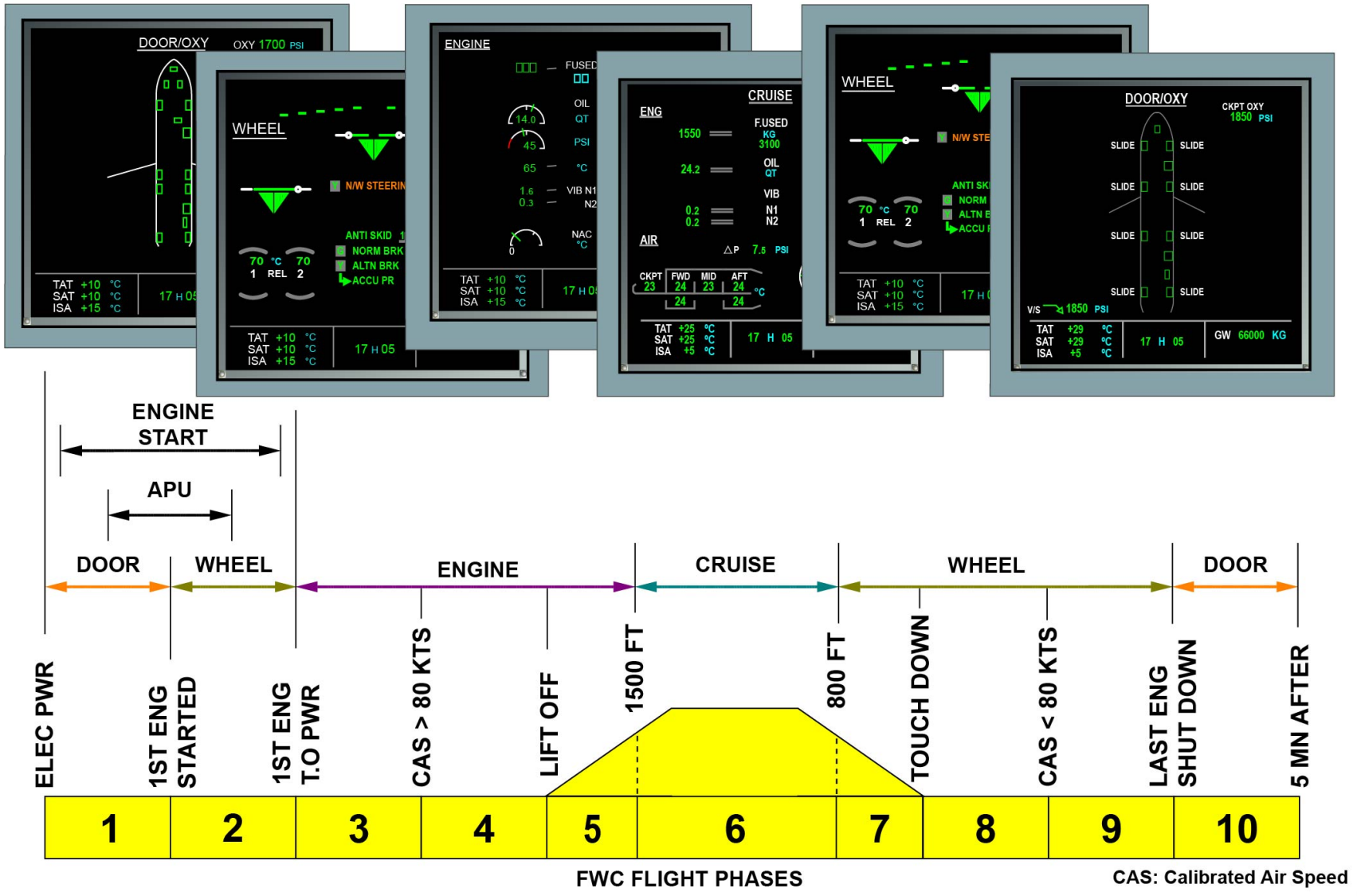


ECAM MODES - AUTOMATIC MODE

UGB13131 - U7ST0M0 - UM31DH000000001

EIS ECAM NORMAL AND MANUAL MODE DESCRIPTION (3)

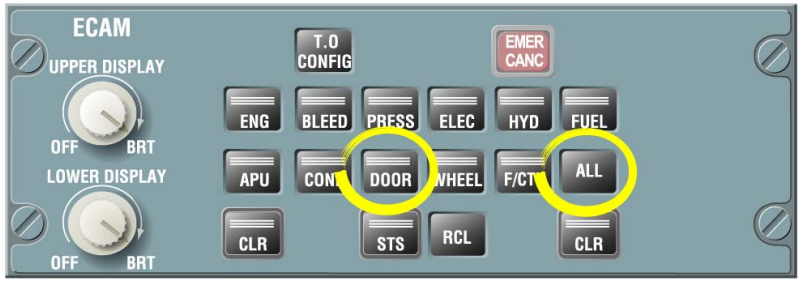
ECAM MODES (continued)

MANUAL MODE

When one of the system key is pressed, the corresponding system page is displayed on the SD and the ECP key light comes on. When the key is pressed a second time, the key light extinguishes, and the page corresponding to the flight phase or current warning is displayed again. In the event of an ECAM control panel failure, due to the built in redundancy, the system pages are still available through the ALL key. When the ALL key is pressed and held, all the system pages are displayed successively in one second intervals. This key, when pressed repeatedly, will enable the display of the next system page.

UGB13131 - U7ST0M0 - UM31DH000000001

ECAM CONTROL PANEL (11VU)



SYSTEM DISPLAY (SD)

These DOOR/OXY page is shown with metric units.
This display is shown as examples.

ECAM MODES - MANUAL MODE

ECAM ADVISORY & FAILURE RELATED MODES (3)

ALERT CLASSIFICATION

GENERAL

The alerts are classified in three levels. They depend on the importance and urgency of the corrective actions required.
- level 3: warnings (highest priority)
- level 2: cautions
- level 1: cautions
- status messages

At each level, the alert messages are also classified by priority order.

LEVEL 3

Level 3 corresponds to an emergency configuration. Corrective or palliative action must be taken by the crew immediately.
These warnings are associated with:
- Continuous Repetitive Chime (CRC) or specific sound,
- warning messages on Liquid Crystal Display (LCD),
- MASTER WARNing light flashing red.

Typical level 3 warnings are:
- aircraft in dangerous configuration or limit flight conditions (Stall, overspeed),
- system failure altering flight safety (Engine fire, excess cabin altitude),
- serious system failure (Dual hydraulic failure).

LEVEL 2

Level 2 agrees with an abnormal configuration. Immediate crew awareness is required, but not immediate corrective action. The crew must decide when to take the corrective action.
These warnings are associated with:
- Single Chime (SC),
- MASTER CAUTion light amber,
- warning messages on LCD.

The level 2 system failure has no direct consequence on flight safety.

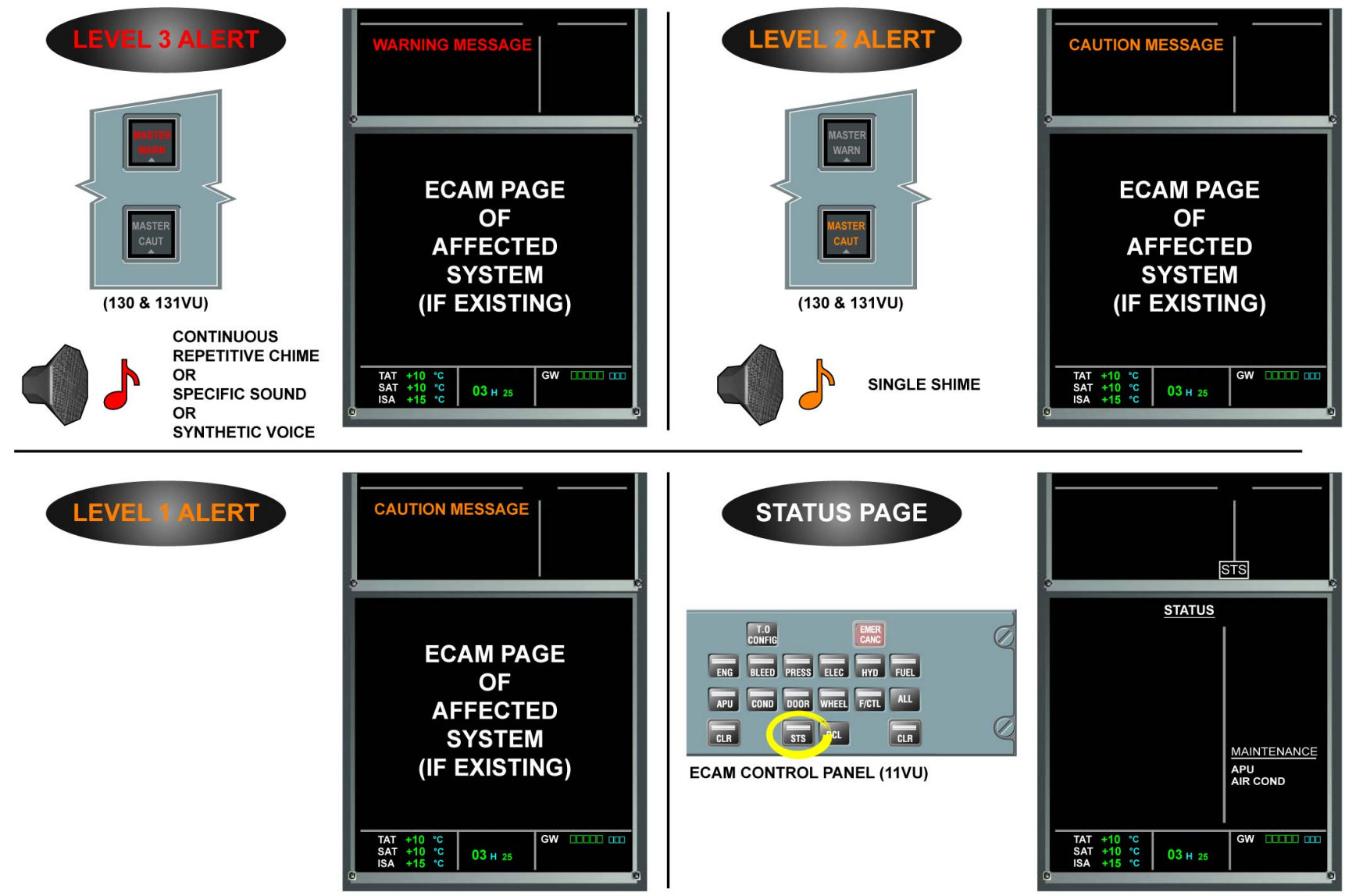
LEVEL 1

Level 1 agrees with a configuration requiring crew monitoring, mainly failures leading to a loss of redundancy or degradation of a system. The attention getters (lights and sounds) are not activated by a level 1 alert.

STATUS

Some defects which do not trigger warnings or cautions, but which require further maintenance actions, will be indicated to the crew by means of a status indication, pulsing after engine shutdown. It is necessary to call the status page manually to see the title of the affected system.

UGB13131 - U7ST0M0 - UM31D3000000002



ALERT CLASSIFICATION - GENERAL ... STATUS

ECAM ADVISORY & FAILURE RELATED MODES (3)

TYPE OF FAILURE

GENERAL

The failures may be of three different types, independently of their classification.
There are 3 separate types of warnings or cautions:
- those associated with an independent failure,
- those associated with a primary failure,
- those associated with a secondary failure.

INDEPENDANT FAILURE

An independent failure is a failure, which affects an isolated item of equipment or system without affecting another one.
Example: Flight Warning Computer (FWC) 1 failure.

NOTE: An independent failure is displayed with the title underlined.

PRIMARY FAILURE

A primary failure is a failure of an item of equipment or system causing the loss of other equipment.
Example: Green hydraulic system failure may lead to the loss of a pair of spoilers.

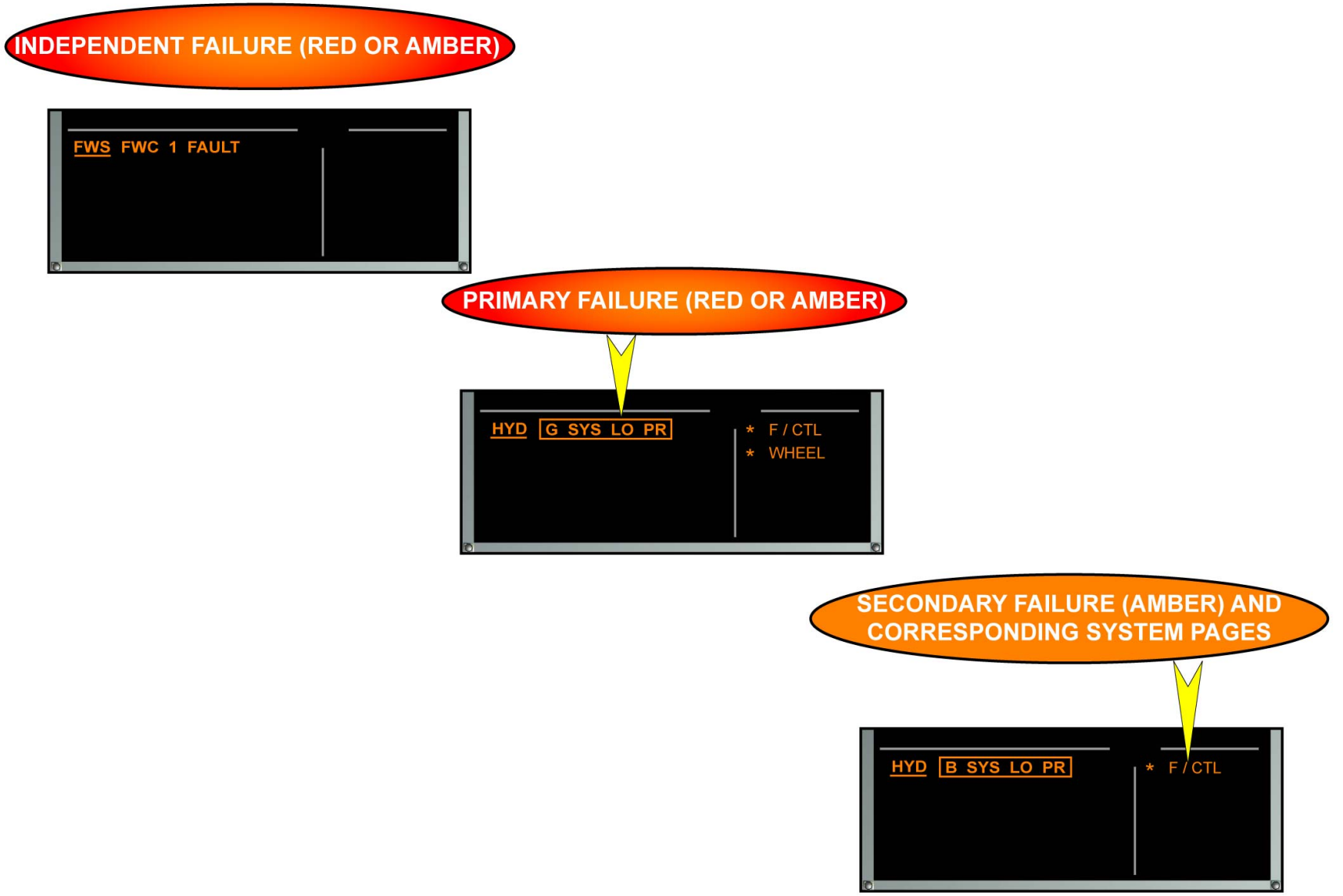
NOTE: A primary failure is displayed with a box around the failure.

SECONDARY FAILURE

A secondary failure is a loss of an item of equipment or system resulting from a primary failure.
Example: Loss of a pair of spoilers after a hydraulic system failure.
The titles of the system pages corresponding to the secondary failures are indicated on the lower right part of the Engine/Warning Display (EWD) by an asterisk.

NOTE: This part can be used if necessary to display heading titles of warnings if the left part of the EWD is full.

UGB13131 - U7ST0M0 - UM31D3000000002


INDEPENDENT FAILURE (RED OR AMBER)
FWS FWC 1 FAULT
PRIMARY FAILURE (RED OR AMBER)
HYD G SYS LO PR
* F / CTL
* WHEEL
SECONDARY FAILURE (AMBER) AND CORRESPONDING SYSTEM PAGES
HYD B SYS LO PR
* F / CTL

TYPE OF FAILURE - GENERAL ... SECONDARY FAILURE

ECAM ADVISORY & FAILURE RELATED MODES (3)

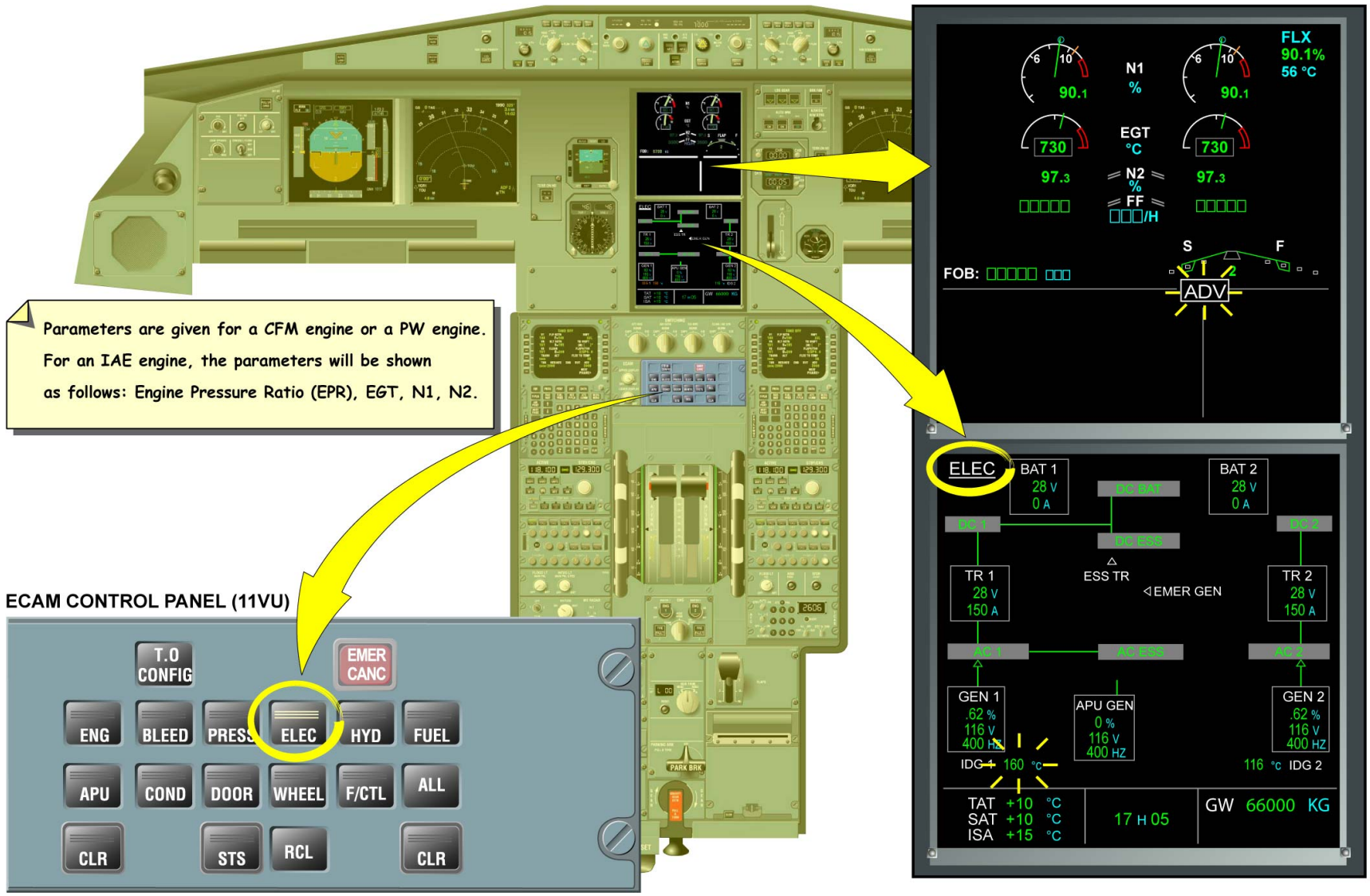
ADVISORY

ADVISORY MODE IN NORMAL DUAL DISPLAY

The value of some critical system parameters is monitored by an advisory mode. In Electronic Centralized Aircraft Monitoring (ECAM) normal display, when there is a deviation of a value from its normal range, the related system page is displayed automatically to get the crew attention before this value gets to the warning or caution level. The affected parameter gives pulses. The related key light on the ECAM Control Panel (ECP) is on steady.
The flashing symbol ADV is displayed on the lower part of the EWD when:
- The crew did the manual selection of an SD page and there is an advisory on another SD page.
- A failure is detected by the FWC and there is an advisory on another SD.
- There are many advisories on different SD pages. When this occurs, the SD page which contains the first detected advisory is displayed. But the ADV symbol will flash to indicate to the crew that there are one or more advisories.
Example: The ELEC page will be displayed if the IDG temperature increases above its normal value, but is still below the threshold of the warning.

NOTE: An advisory can possibly lead to a failure, but not always. They are totally independent one from the other.

UGB13131 - U7ST0M0 - UM31D3000000002



ADVISORY - ADVISORY MODE IN NORMAL DUAL DISPLAY

ECAM ADVISORY & FAILURE RELATED MODES (3)

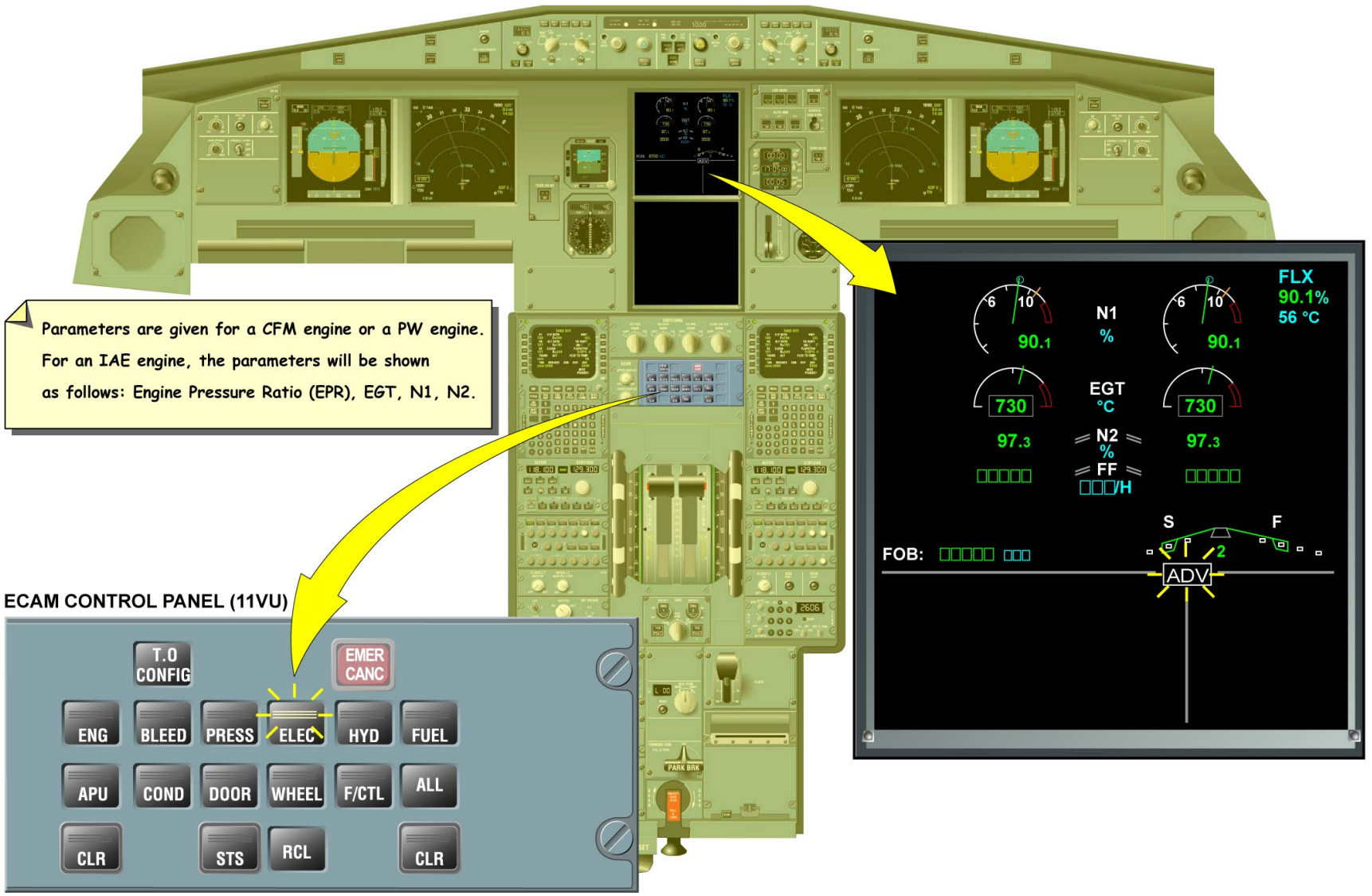
ADVISORY (continued)

ADVISORY MODE IN ECAM MONO DISPLAY

In ECAM MONO display mode (one ECAM LCD remaining), when a value drifts from its normal range, a white ADV message flashes in the center of the EWD to attract crew attention. As the corresponding system page cannot be displayed automatically on the System Display (SD), the pilot has to fetch the information on the ECP: the associated key light flashes to indicate which system is concerned.

NOTE: The ELEC system page is given as an example.

UGB13131 - U7ST0M0 - UM31D3000000002



ADVISORY - ADVISORY MODE IN ECAM MONO DISPLAY

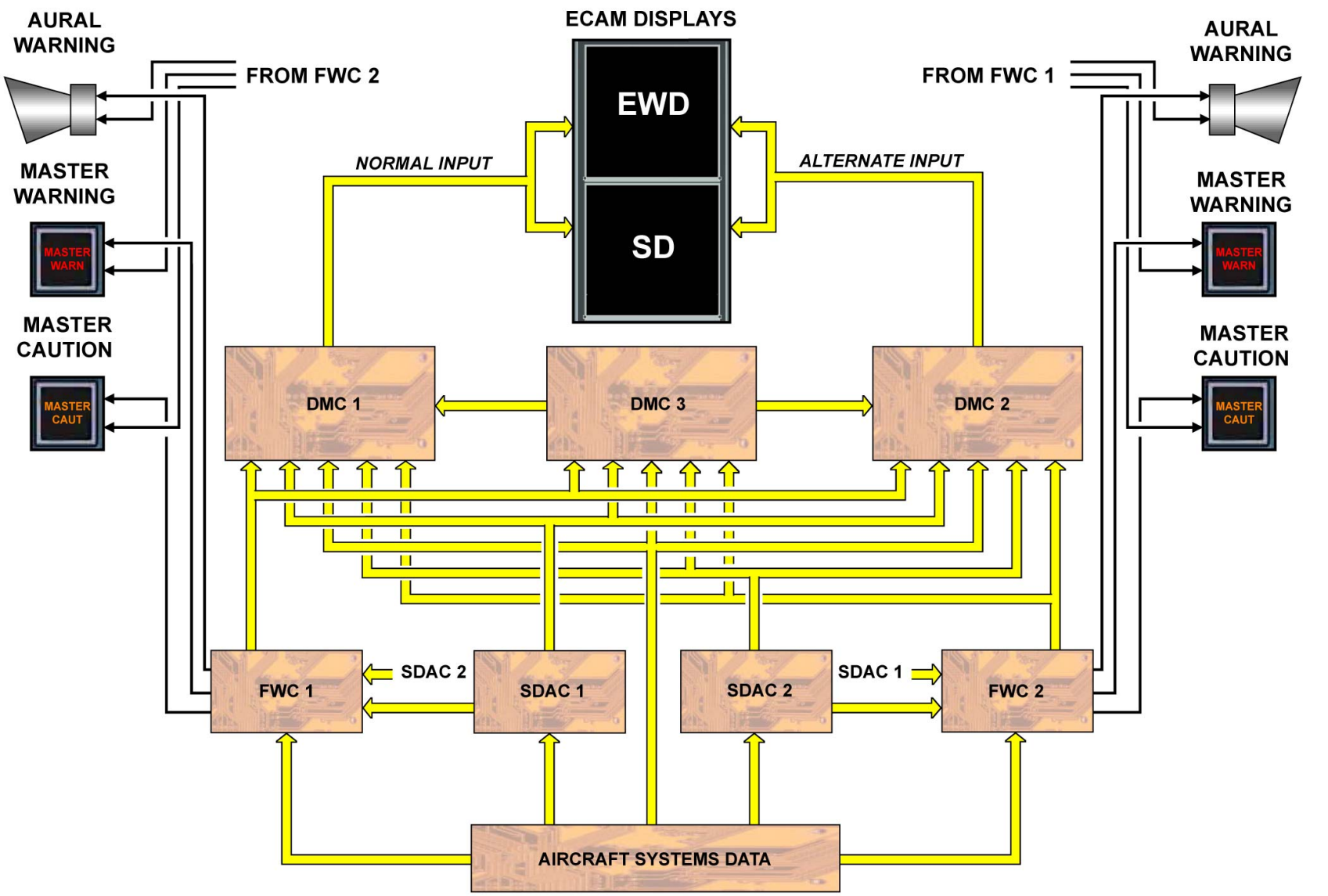
ECAM DESCRIPTION/OPERATION (3)

GENERAL PRESENTATION

The Electronic Centralized Aircraft Monitoring (ECAM) performs three main functions:
- Data acquisition and concentration,
- Data warning computation,
- Warning announcement and data display.

Data acquisition is shared between the System Data Acquisition Concentrators (SDACs),the Flight Warning Computers (FWCs) and the Display Management Computers (DMCs). Data warning computation and memo are achieved by the FWCs, warning announcements and data display are made through loudspeakers and Display Units (DUs).

UGB13131 - U7ST0M0 - UM31D1000000001



GENERAL PRESENTATION

ECAM DESCRIPTION/OPERATION (3)

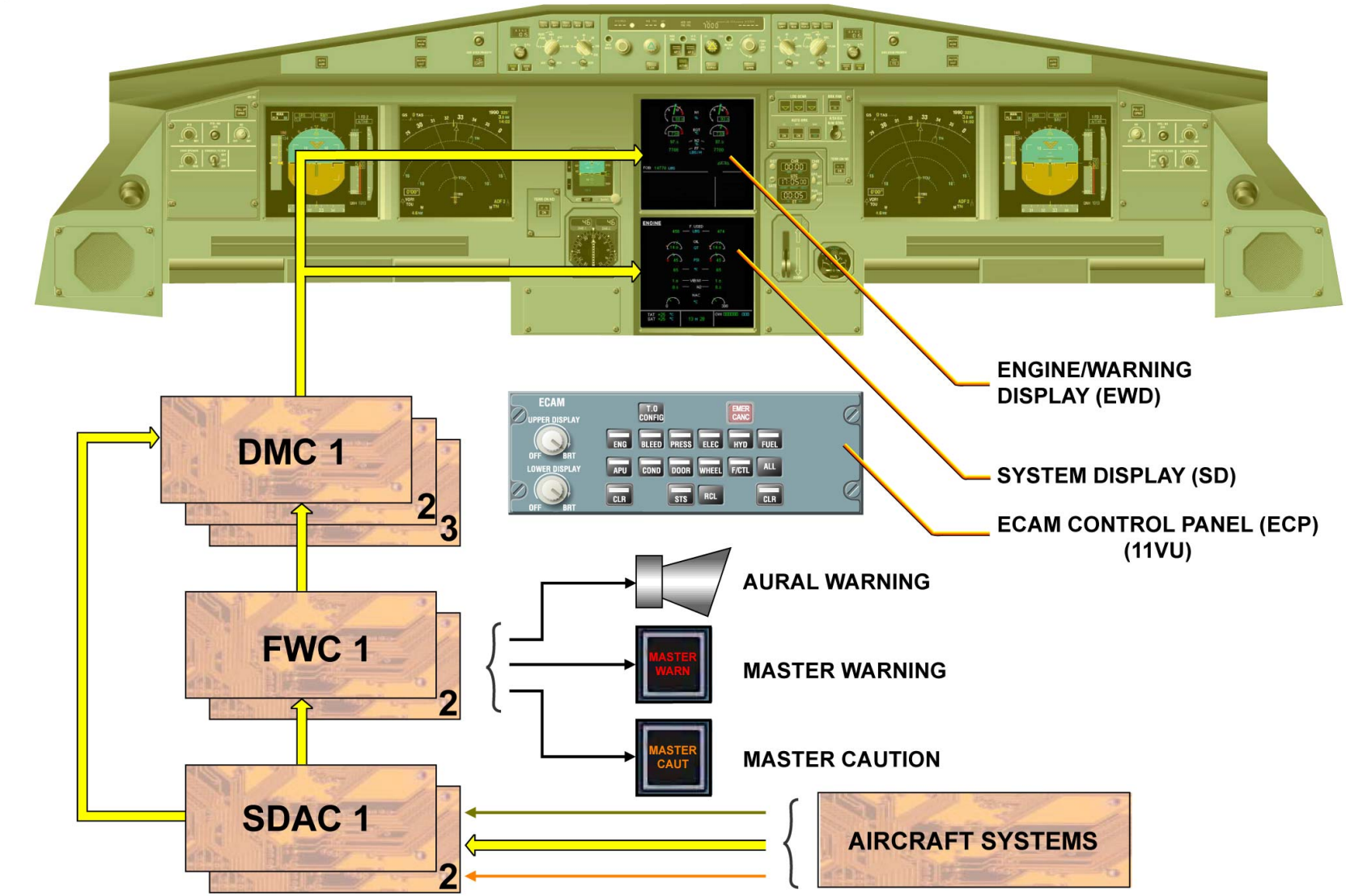
ECAM SYSTEM

ECAM system components are:
- SDACs,
- FWCs,
- DMCs,
- ECAM Control Panel (ECP).

SDAC

The two SDACs are identical and interchangeable. [The SDACs acquire A/C systems malfunction/failure data corresponding to caution situations and send them to the FWCs for generation of the corresponding alert and procedure messages. [The two SDACs also acquire and send to the 3 DMCs A/C system signals necessary for the display of system information. The ECP is the user interface to the ECAM system.

UGB13131 - U7ST0M0 - UM31D1000000001



ECAM SYSTEM - SDAC

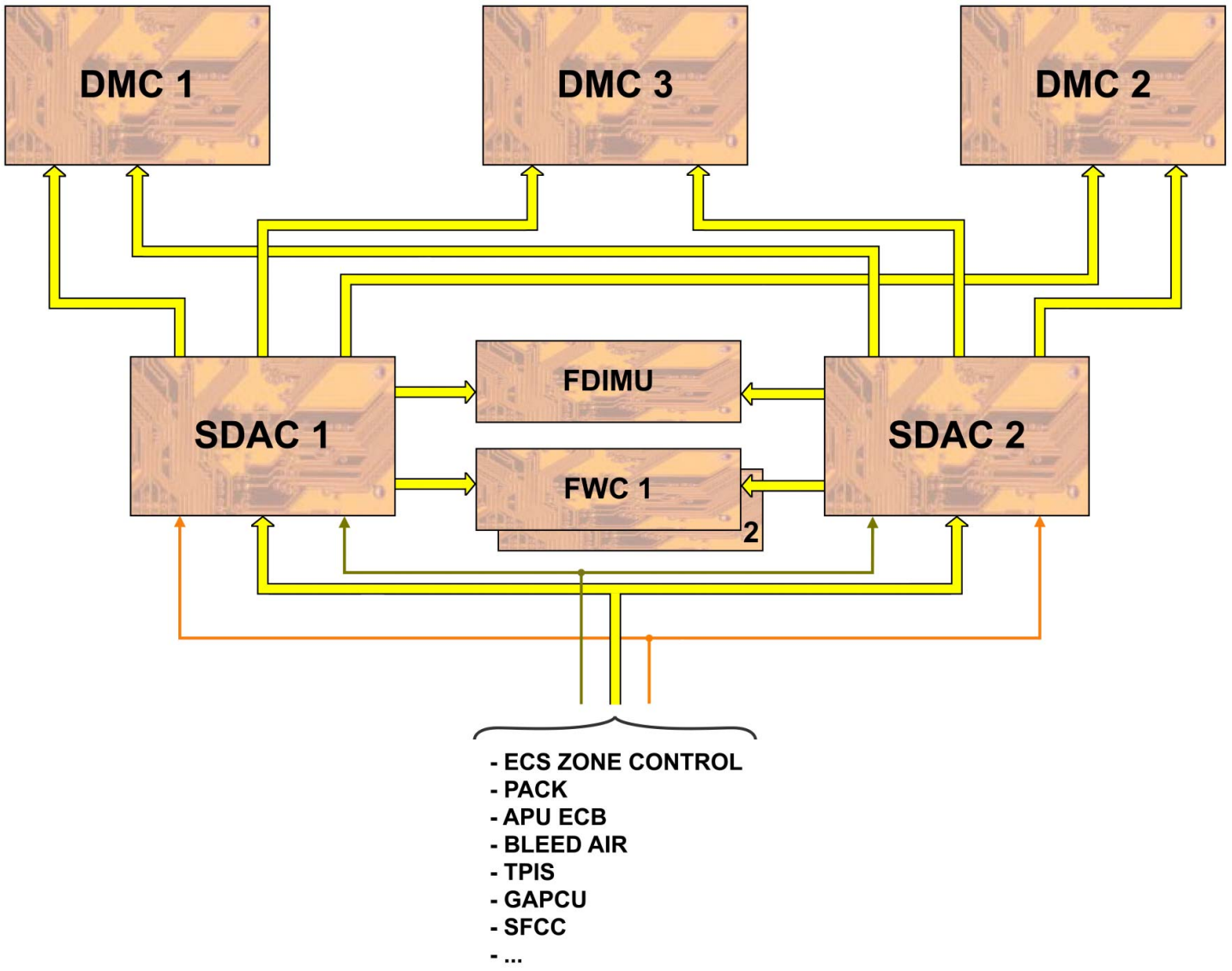
ECAM DESCRIPTION/OPERATION (3)

ECAM SYSTEM (continued)

SDAC DATA PROCESSING

Therefore, each parameter acquired is given to the two SDACs. All the signals (discrete, analog, digital) entering the SDACs are converted into digital format and delivered on their output buses under ARINC 429. The SDACs copy certain parameters to distribute them to other equipment in digital form (ARINC 429).

UGB13131 - U7ST0M0 - UM31D1000000001



ECAM SYSTEM - SDAC DATA PROCESSING

ECAM DESCRIPTION/OPERATION (3)

ECAM SYSTEM (continued)

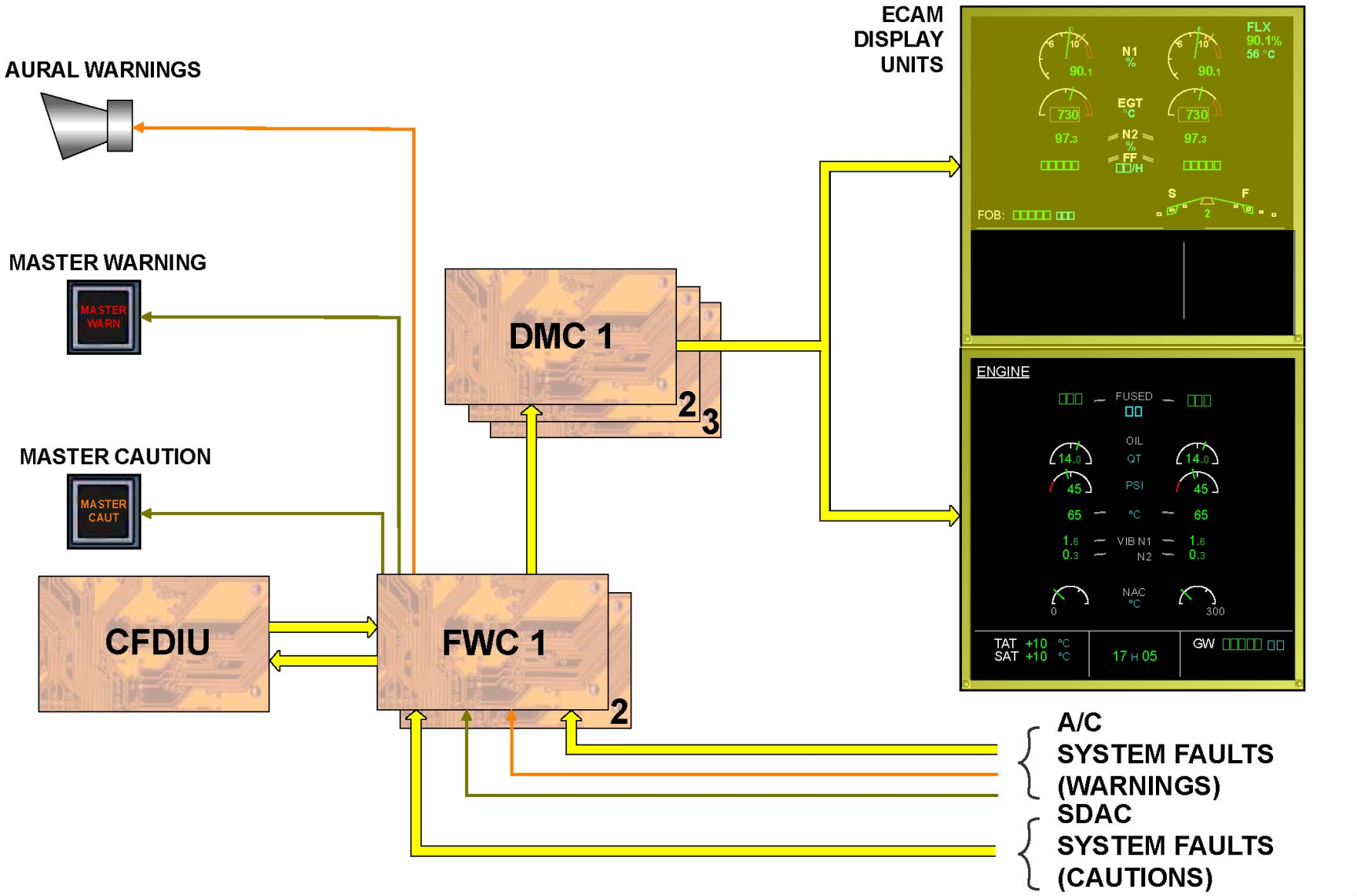
FWC

The two FWCs are interchangeable. Each FWC generates alphanumeric codes corresponding to all texts and messages to be displayed on [the ECAM DUs. [The aural warnings and synthetic voices are delivered by the FWCs to the cockpit loudspeakers. The FWCs compute all warnings and cautions.
The FWCs perform three main functions:
- Data acquisition,
- Flight phase computation,
- Data warning computation corresponding to warning situations.

The FWCs outputs/inputs are:
- Discrete for visual attention getters,
- Analog for audio signals,
- ARINC 429 called FWC DATA BUS,
- RS 422 called FWC MESSAGE BUS.

Each FWC sends a copy of its own acquisition through an ARINC 429 bus to the opposite FWC.
The FWCs provide aural and visual information in order to:
- Show, in real time, all the system failures and dangerous configurations with their level of seriousness,
- Identify the systems or circuits affected by a failure,
- Provide the appropriate corrective action.

UGB13131 - U7ST0M0 - UM31D1000000001



ECAM SYSTEM - FWC

ECAM DESCRIPTION/OPERATION (3)

ECAM SYSTEM (continued)

DMC

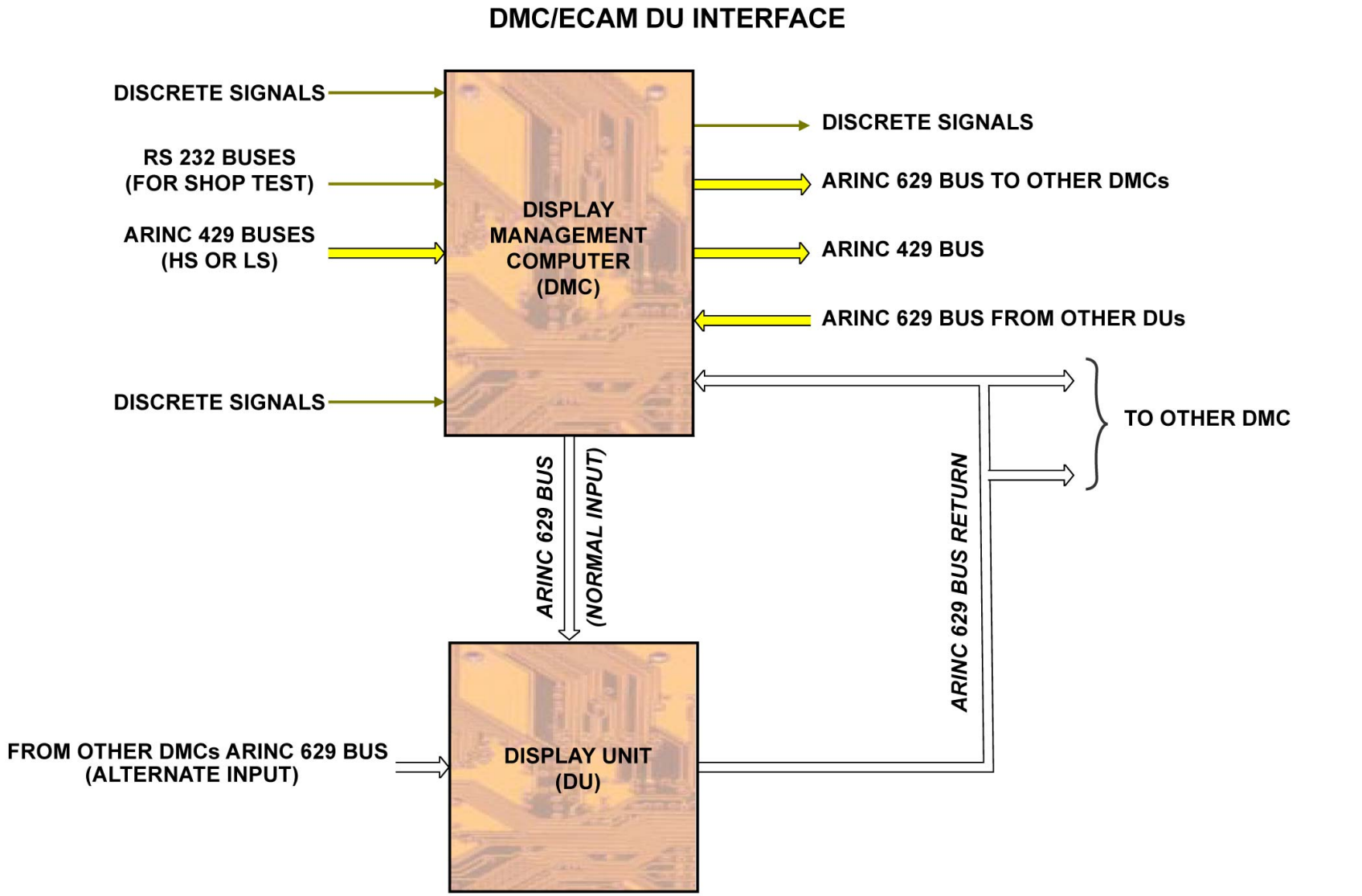
The three DMCs are identical and interchangeable. The DMCs receive data from the A/C systems, either directly or through the SDACs and FWCs. The 3 DMCs can be considered as data concentrators and receive data from A/C sensors and systems in order to merge and send them to the DUs through ARINC 629 output buses. Moreover, the DMCs insure:

- The interface between EIS and the other A/C computers and systems,
- The information exchange between the displays,
- The tele-loading of the operational software.

The DMCs acquire and send several types of signals for ECAM:

- Discrete,
- ARINC 629 bus,
- ARINC 429 bus,
- RS 232 buses for workshop test,
- ARINC 453 bus (just passing through).

UGB13131 - U7ST0M0 - UM31D1000000001



ECAM SYSTEM - DMC

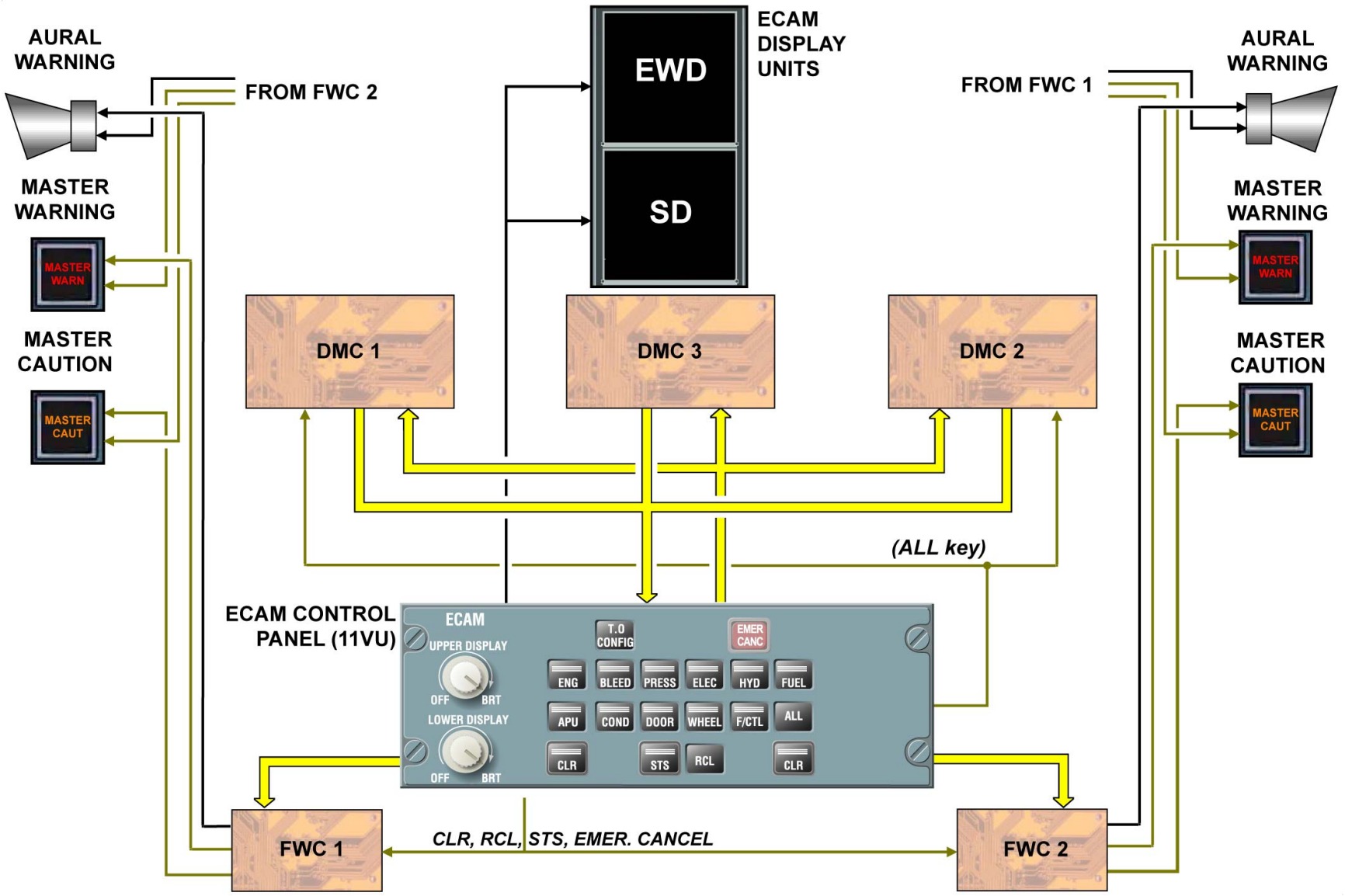
ECAM DESCRIPTION/OPERATION (3)

ECP INTERFACE

The ECAM interface includes:
- ECAM control panel,
- The warning and caution lights,
- The loudspeaker,
- The DUs.

The ECP is a control and display unit. [It transmits selections to the FWCs and DMCs, [it receives DMC data to illuminate the keys lights. [The ECP outputs discretes for CLEAR (CLR), RECALL (RCL), STATUS (STS) and emergency cancel (EMER CANC) keys are linked to the FWCs. The output discrete for ALL key is directly linked to the DMCs. [It is also linked to the DUs for ON/OFF brightness control.

UGB13131 - U7ST0M0 - UM31D1000000001



ECP INTERFACE

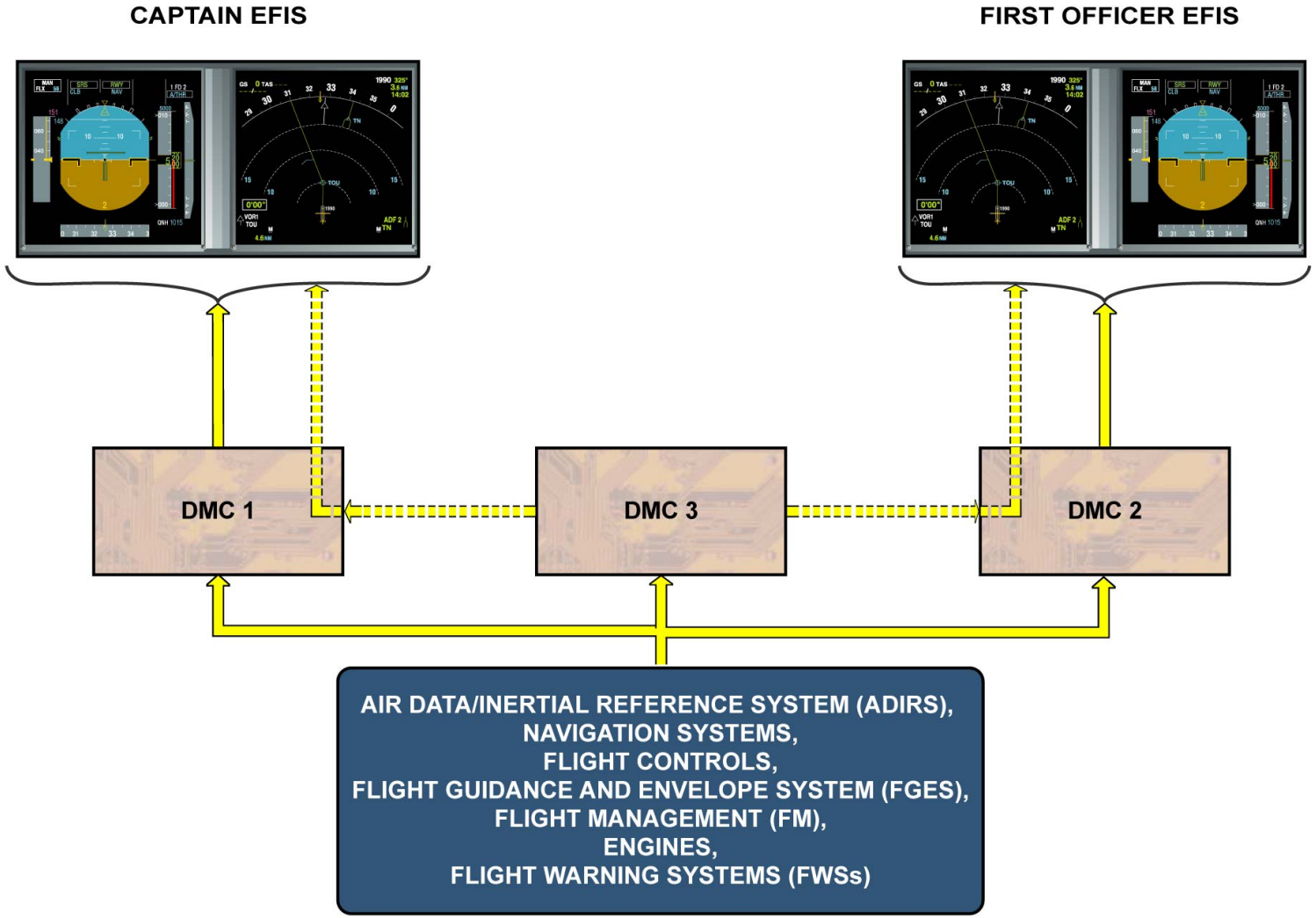
EFIS DESCRIPTION/OPERATION (3)

GENERAL

The Electronic Flight Instrument System (EFIS) consists of two main components:
- Display Management Computers (DMCs),
- Display Units (DUs).

The DMCs receive Air Data/Inertial Reference System (ADIRS), navigation systems, Flight Management (FM), Flight Guidance and Envelope System (FGES), flight controls, engines and Flight Warning Systems (FWSs) required by the DUs in order to generate Primary Flight Display (PFD) and Navigation Display (ND) symbologies.

UGB13131 - U7ST0M0 - UM31D2000000001


CAPTAIN EFIS
FIRST OFFICER EFIS
DMC 1
DMC 3
DMC 2
AIR DATA/INERTIAL REFERENCE SYSTEM (ADIRS),
NAVIGATION SYSTEMS,
FLIGHT CONTROLS,
FLIGHT GUIDANCE AND ENVELOPE SYSTEM (FGES),
FLIGHT MANAGEMENT (FM),
ENGINES,
FLIGHT WARNING SYSTEMS (FWSs)

GENERAL

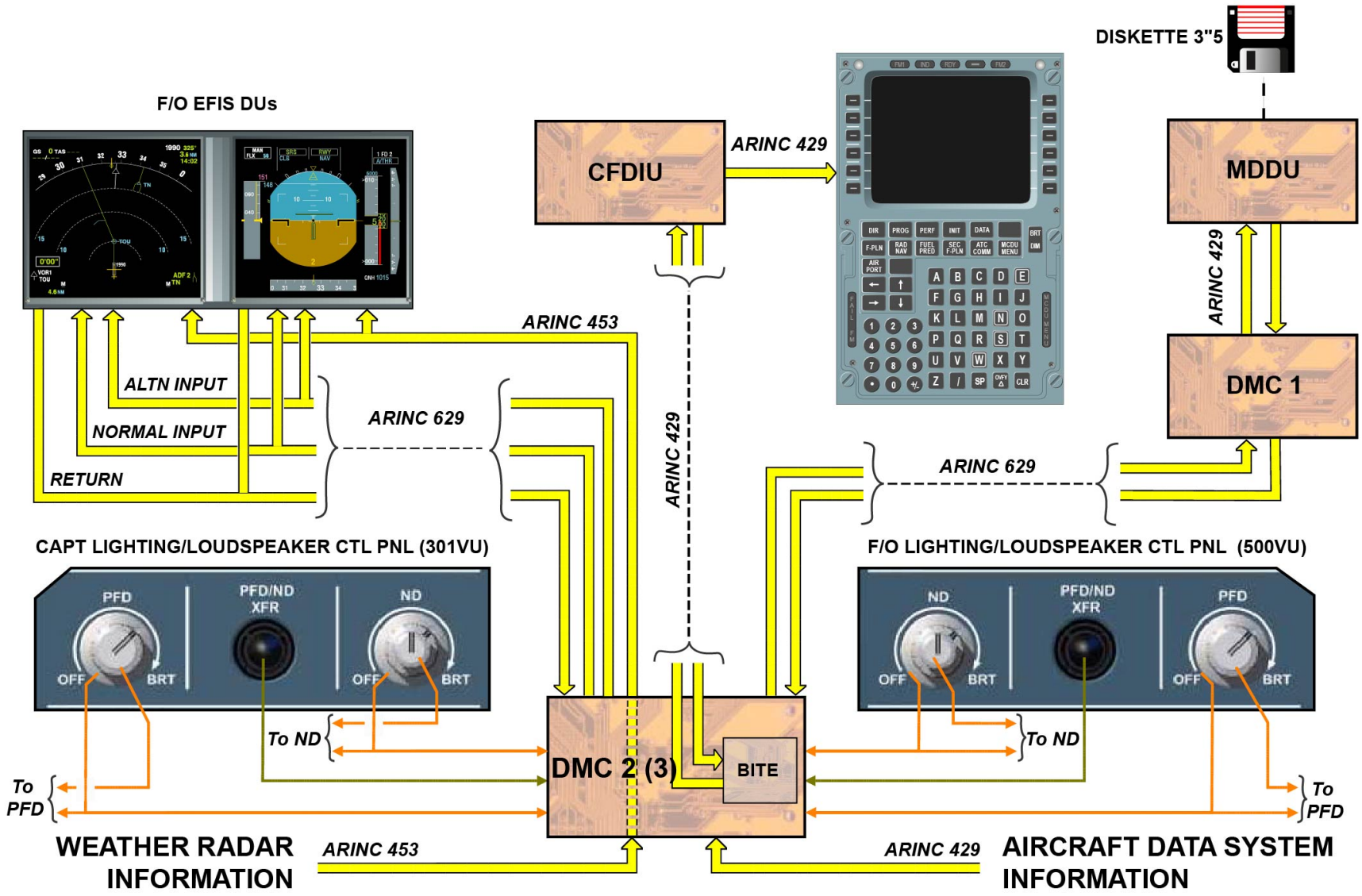
EFIS DESCRIPTION/OPERATION (3)

DMC

The three DMCs are identical and interchangeable, they receive A/C system data on ARINC 429 buses, weather radar information on ARINC 453 high-speed bus, [analog signal for the brightness control, [discrete signal for the PFD/ND transfer and PFD/ND ON/OFF.
DMCs send data on an ARINC 629 link to the DUs. [When a new DMC 1, 2 or 3 is installed, the relevant software must be downloaded into it, this is done by cross loading from DMC 1, 2 or 3 via the MCDU. If a new software must be loaded, it is first done on DMC 1 from the Multipurpose Disk Drive Unit (MDDU), then a cross loading has to be performed. [When a new DU is installed, a cross loading from the corresponding DMC has to be performed via the MCDU. The DMC BITE test is performed and the results are stored for later transfer to the Centralized Fault Display System (CFDS). It is possible to read this information via the MCDU.

NOTE: Note: The software includes DMC (EFIS, ECAM) and DU (EFIS, ECAM) data.

UGB13131 - U7ST0M0 - UM31D2000000001


DISKETTE 3"5
F/O EFIS DUs
CFDIU
ARINC 429
MDDU
ARINC 429
DMC 1
ARINC 453
ALTN INPUT
NORMAL INPUT
RETURN
ARINC 629
ARINC 429
ARINC 629
CAPT LIGHTING/LOUDSPEAKER CTL PNL (301VU)
F/O LIGHTING/LOUDSPEAKER CTL PNL (500VU)
PFD
PFD/ND XFR
ND
OFF
BRT
To ND
To PFD
DMC 2 (3)
BITE
WEATHER RADAR INFORMATION
ARINC 453
ARINC 429
AIRCRAFT DATA SYSTEM INFORMATION

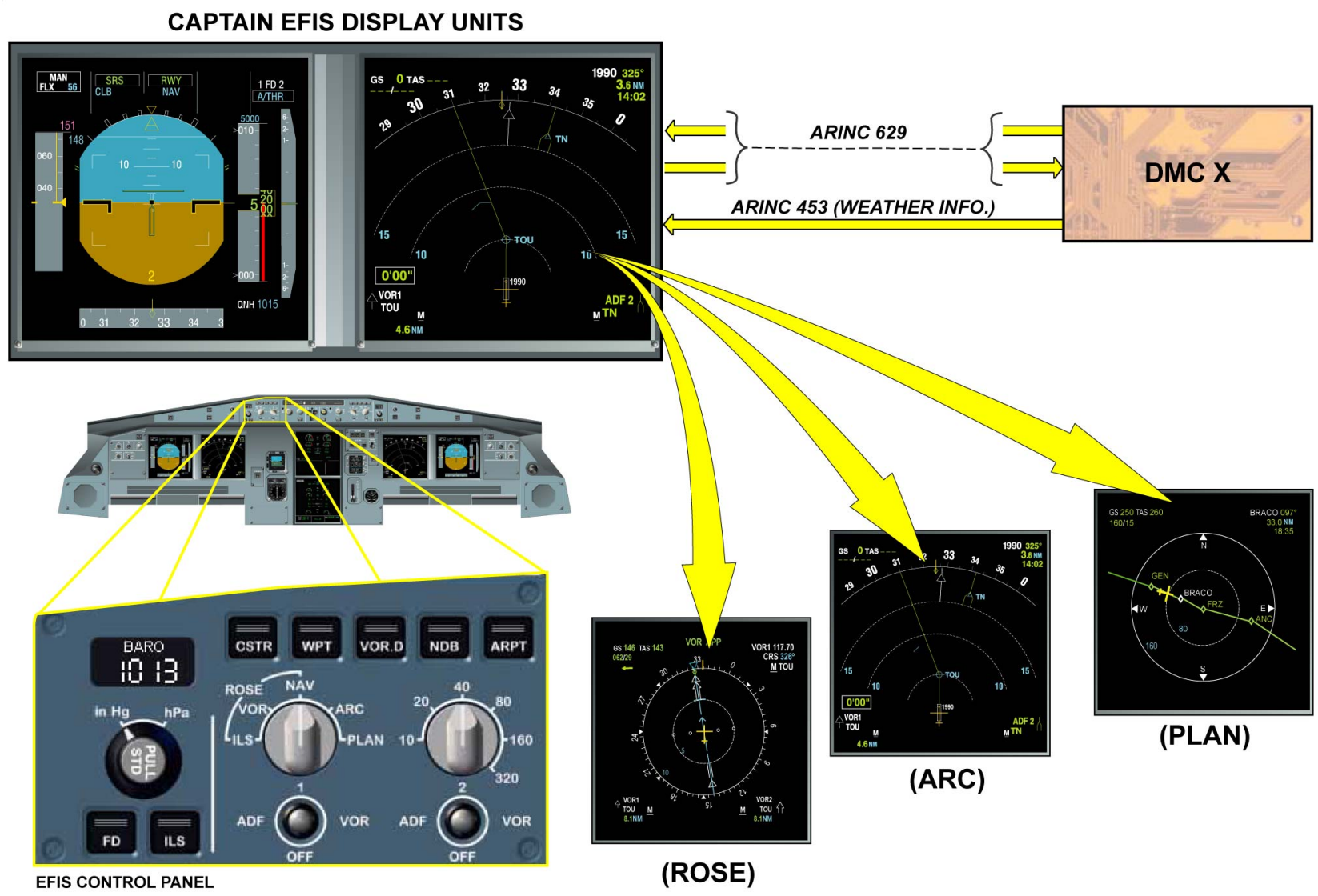
DMC

EFIS DESCRIPTION/OPERATION (3)

DISPLAY UNIT (ND)

The DUs are identical and interchangeable. They are Liquid Crystal Displays. Each DU receives digital signals from [its related DMC through an ARINC 629 link, and also through an ARINC 453 high-speed bus for the weather radar link. The NDs provide this information according to the modes selected on the EFIS control panel (part of the Flight Control Unit). The modes are [ROSE-ILS, ROSE-VOR, ROSE-NAV, [ARC, and [PLAN.

UGB13131 - U7ST0M0 - UM31D2000000001



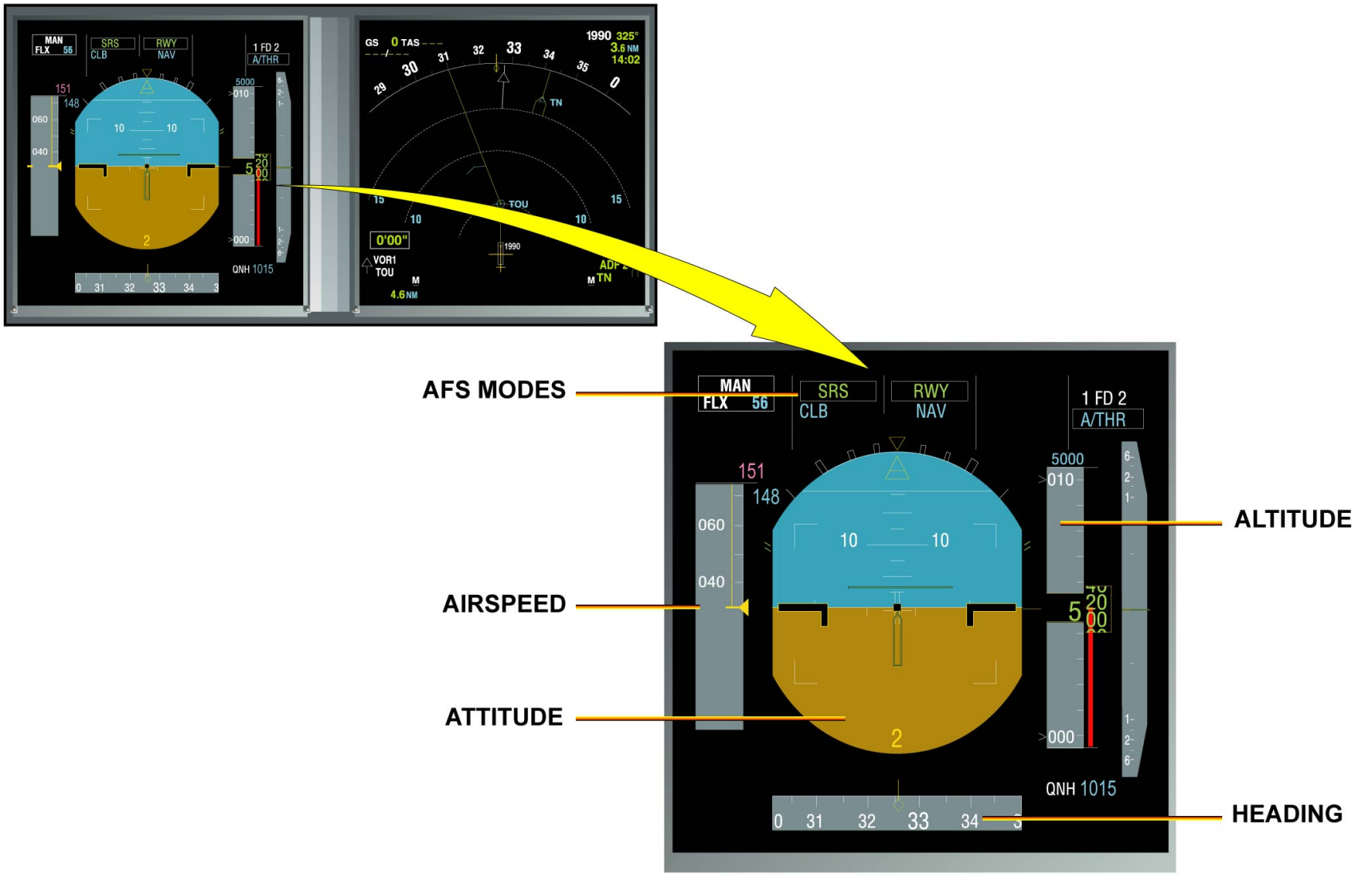
DISPLAY UNIT (ND)

EFIS DESCRIPTION/OPERATION (3)

DISPLAY UNIT (PFD)

The PFDs provide flight information for A/C control, including A/C attitude, [airspeed, [altitude, [heading and [Automatic Flight System modes.
A METRIC ALT pushbutton can be installed on the FCU. If you push this pushbutton, the selected altitude is displayed in meters above the altitude scale.

CAPTAIN EFIS DISPLAY UNITS



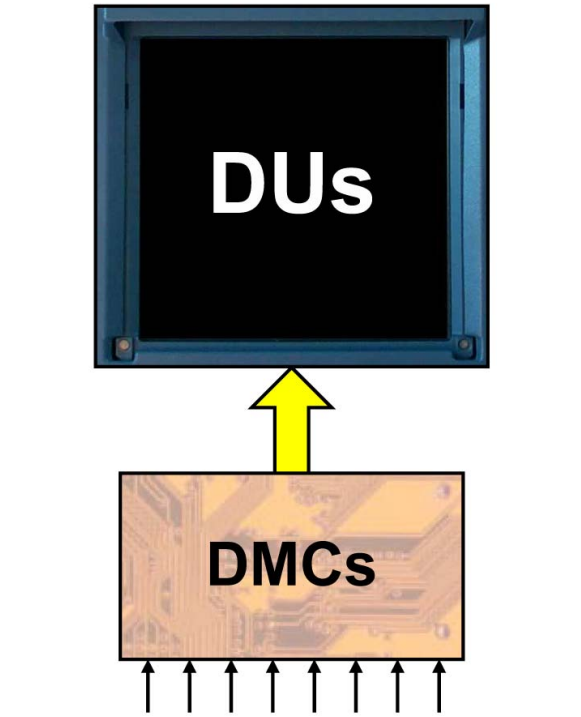
DISPLAY UNIT (PFD)

DMC ARINC BUS RECONFIGURATION (3)

GENERAL

As a general rule, the Display Management Computer (DMC) uses the active aircraft system source for display, provided it is valid or selected.

UGB13131 - U7ST0M0 - UM31D5000000001


DUs
DMCs
ALL AIRCRAFT PARAMETERS
- ENGINE
- HYDRAULIC
- LANDING GEAR
- NAVIGATION
- FUEL
- FLIGHT CONTROLS

GENERAL

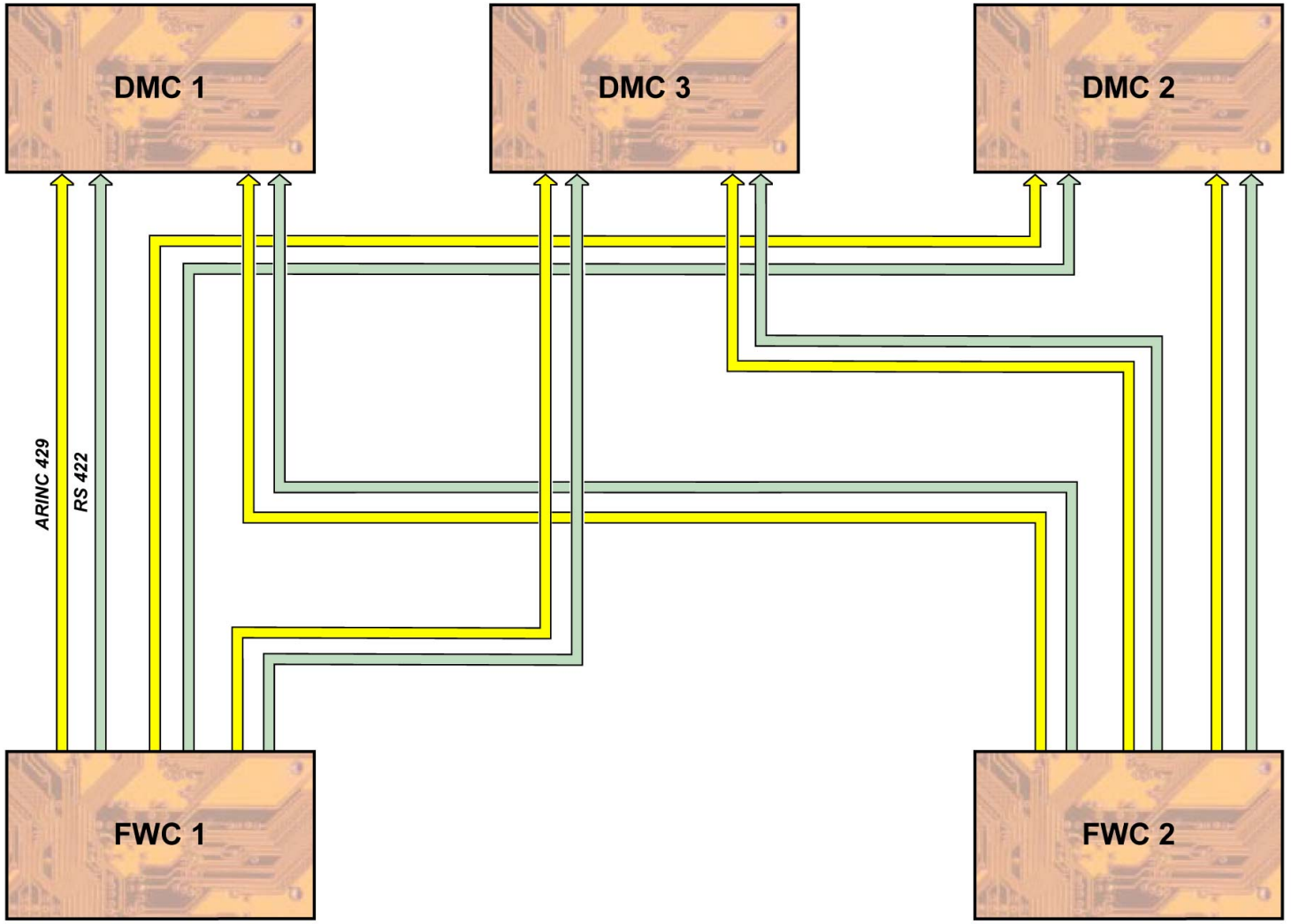
DMC ARINC BUS RECONFIGURATION (3)

FWC

Each DMC receives both Flight Warning Computer (FWC) 1 and 2 data buses. The DMCs preferably work with the FWC1 data. If the data is not valid or if FWC 1 is not valid, the DMCs will automatically switch to the FWC 2 Data bus.

NOTE: the RS 422 buses are used by the FWCs to send text messages (warnings, MEMO and status) to the DMCs.

UGB13131 - U7ST0M0 - UM31D5000000001



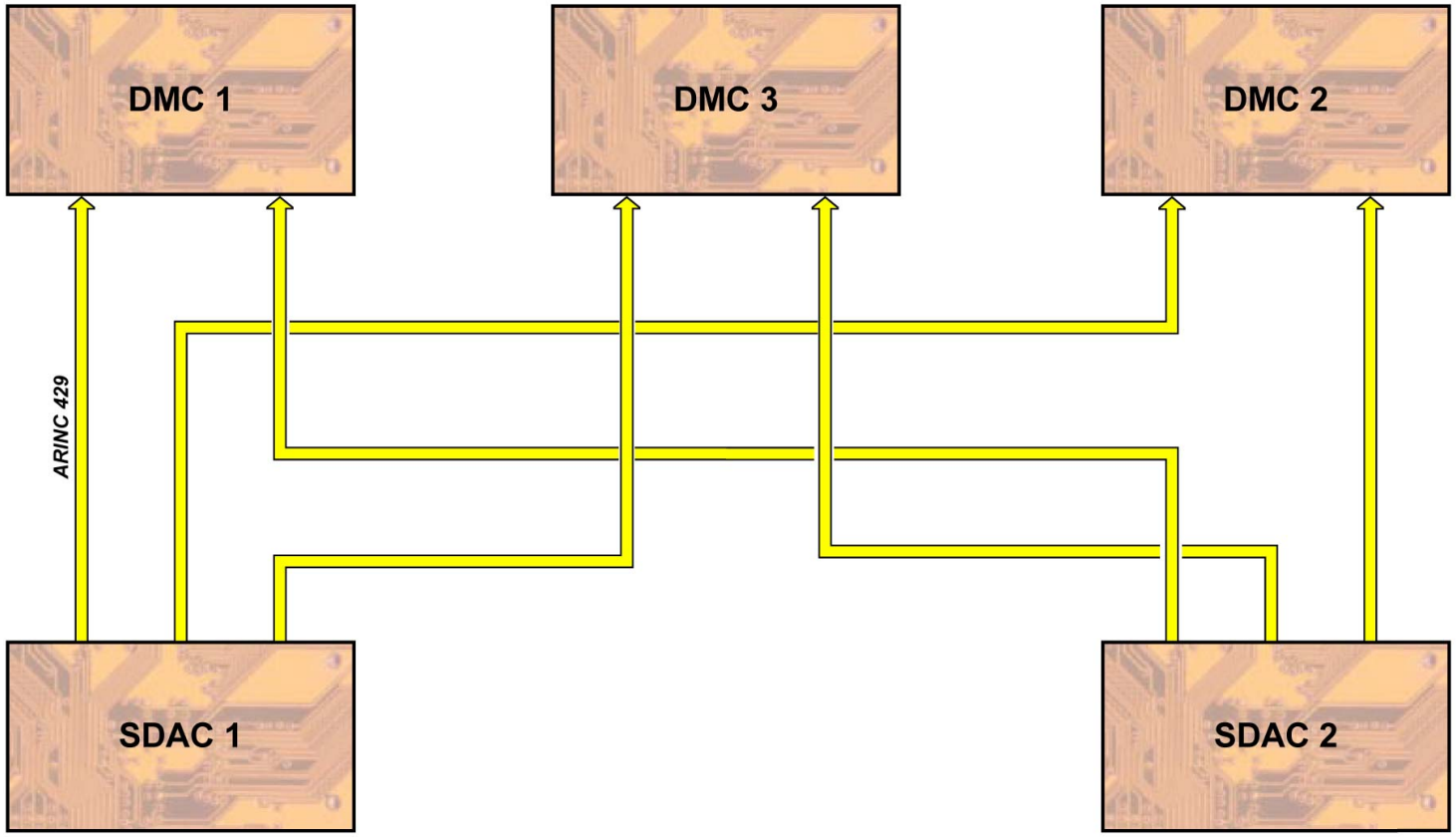
FWC

DMC ARINC BUS RECONFIGURATION (3)

SDAC

Each DMC receives and processes the data from each of the two System Data Acquisition Concentrators (SDACs). The DMCs use SDAC 1 data providing it is valid. All data transfer is by ARINC 429. If the data is not valid or if SDAC 1 is not valid, the DMCs will use the data from SDAC 2.The switching is automatic.

UGB13131 - U7ST0M0 - UM31D5000000001



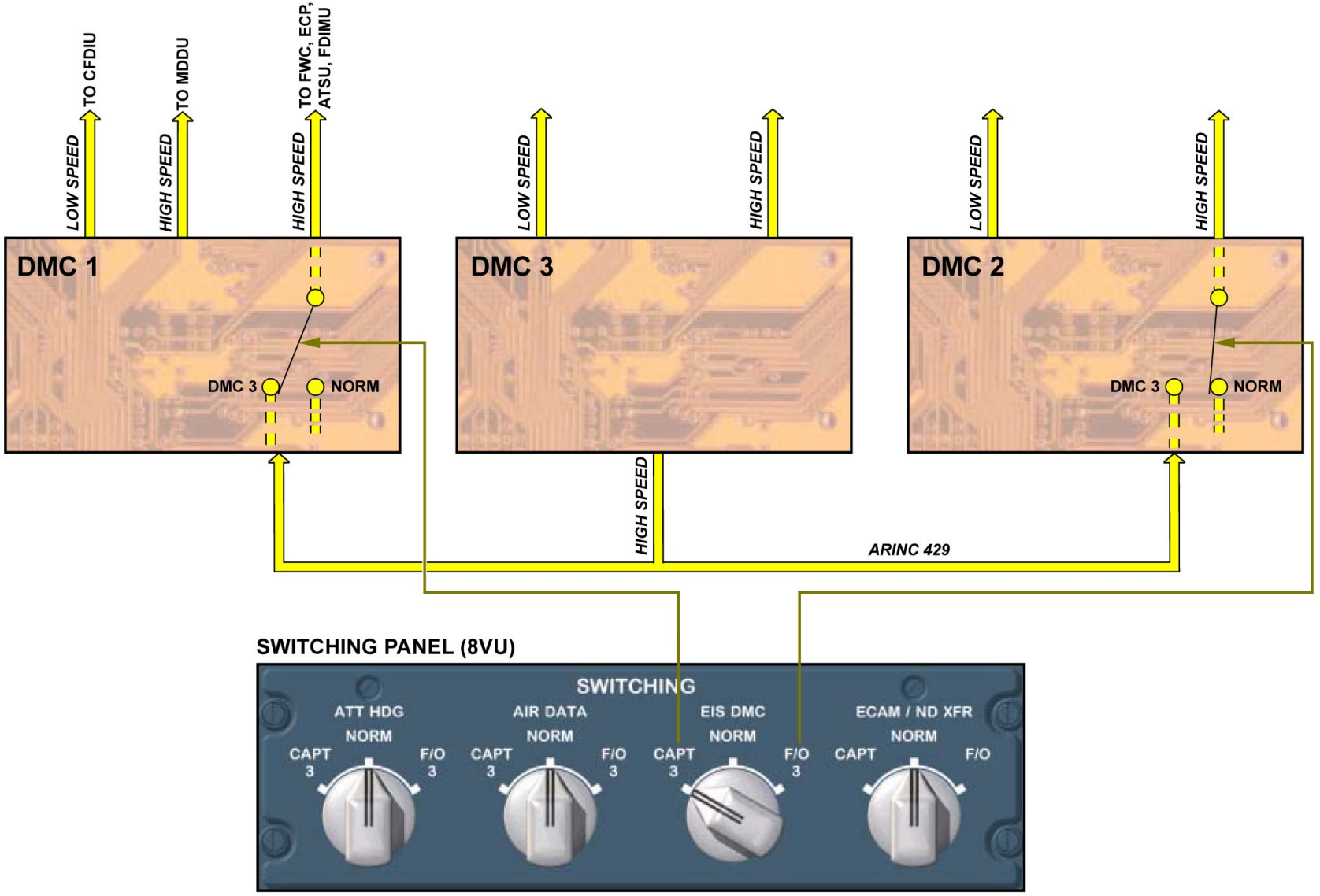
SDAC

DMC ARINC BUS RECONFIGURATION (3)

DMC OUTPUT BUSES

Each DMC transmits data on two ARINC 429 buses:
-One high speed switched bus: FWC, ECAM Control Panel (ECP), Air Traffic Service Unit (ATSU), Flight Data Interface Management Unit (FDIMU),
-One low speed unswitched bus: Centralized Fault Display Unit (CFDIU).
When the EIS DMC Selector Switch is set to CAPT 3 (or F/O 3), DMC 1 (or DMC 2) sends through its output bus the data received from DMC3. The switching is done inside DMC 1 (or DMC 2).

UGB13131 - U7ST0M0 - UM31D5000000001



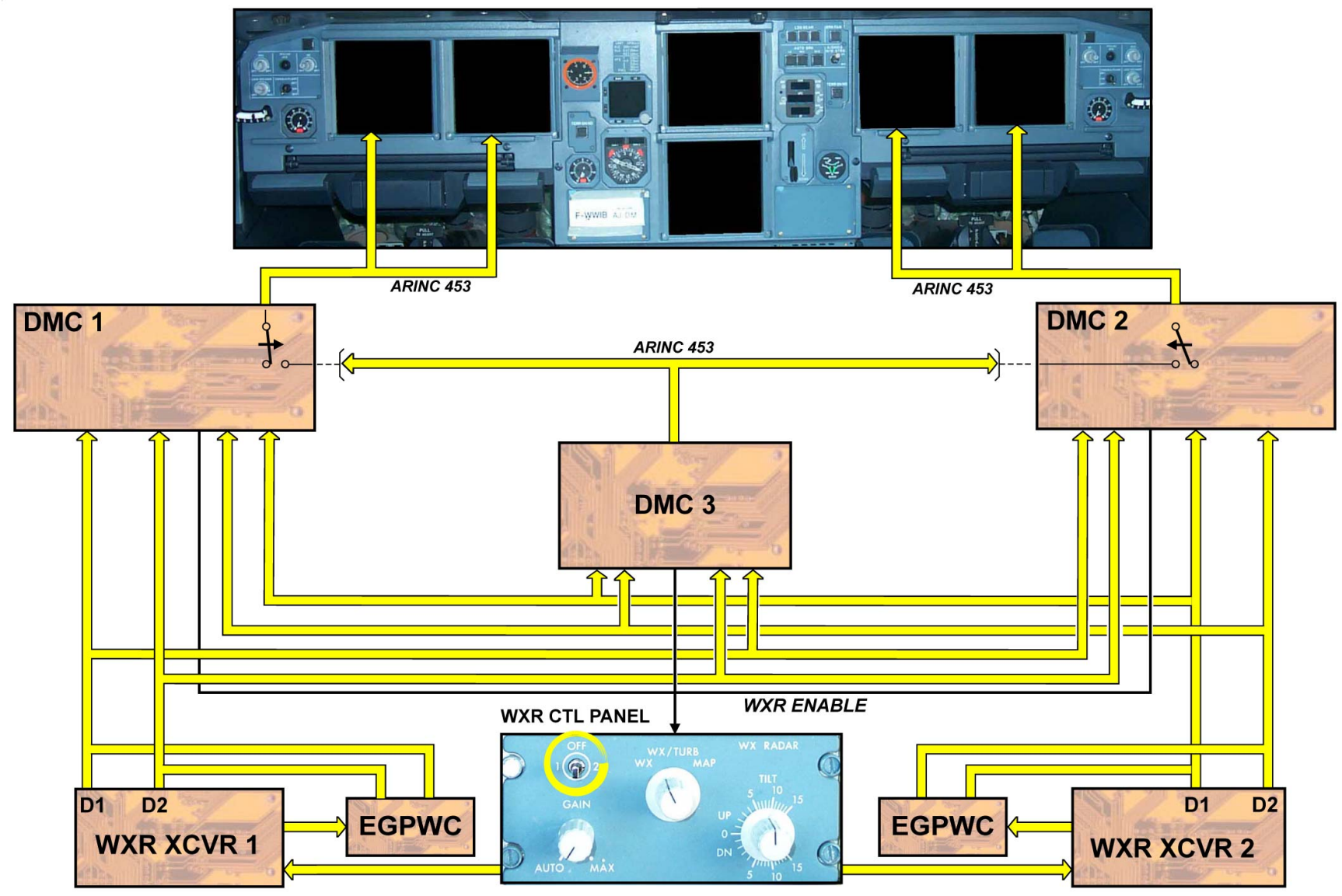
DMC OUTPUT BUSES

DMC ARINC BUS RECONFIGURATION (3)

WEATHER RADAR

Each DMC receives the weather radar (WXR) transceivers (XCVRs) or the Enhanced Ground Proximity Warning Computer (EGPWC) data via four ARINC 453 data buses {D1 and D2}. The DMCs retransmit the ARINC 453 bus to the EFIS DUs. As only one WXR XCVR is in operation at a time, the DMCs process information from the one in operation. The WXR enable discrete disables the operation if the plan mode is selected on the EFIS controller.

UGB13131 - U7ST0M0 - UM31D5000000001



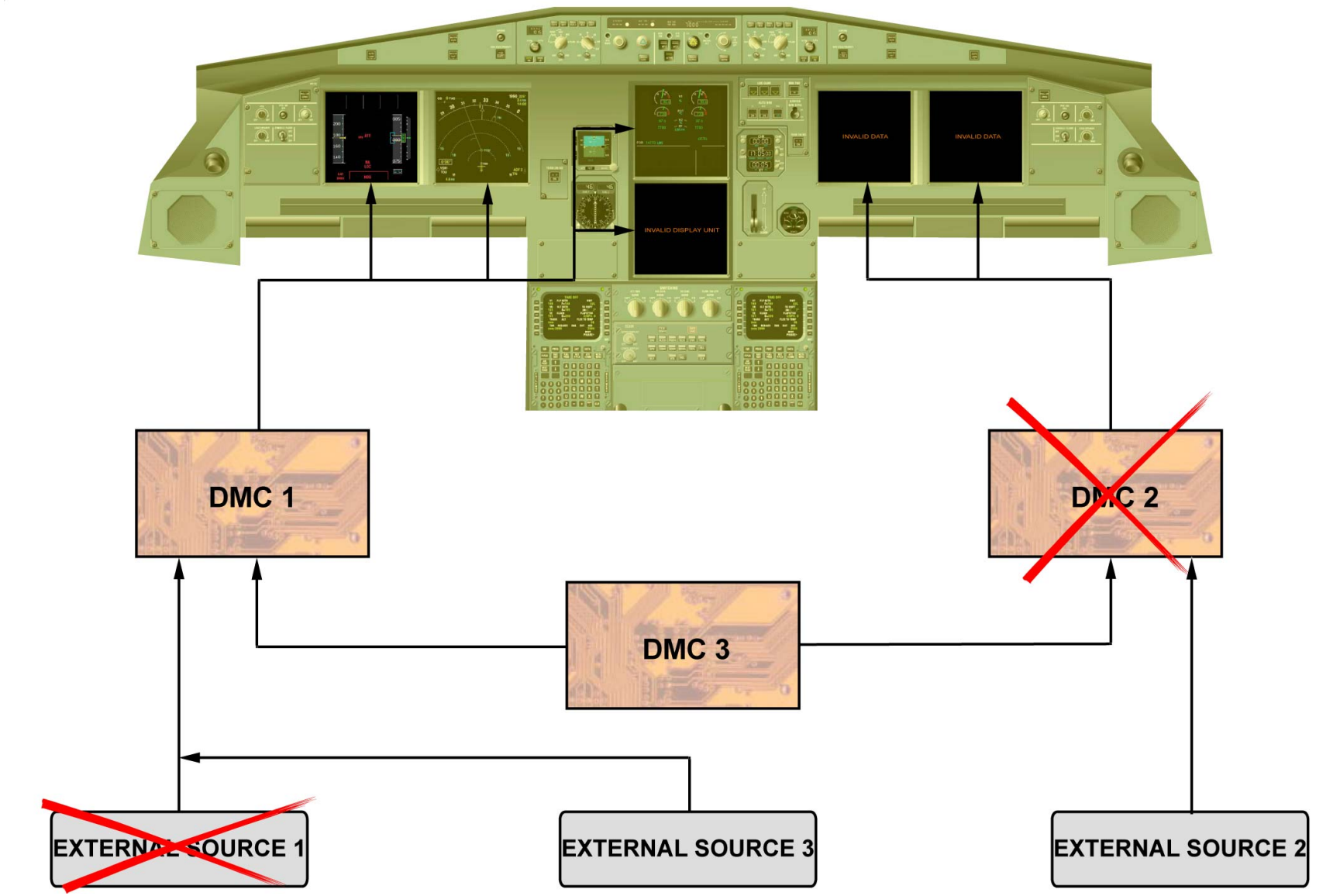
WEATHER RADAR

EIS ABNORMAL OPERATION (3)

EIS ABNORMAL OPERATION

In order to ensure reliability of the displayed data, the Electronic Instrument System (EIS) has three main types of reconfiguration:
- In the case of single or multiple Display Unit (DU) failures,
- In the case of single or multiple Display Management Computer (DMC) failures,
- In the case of external (sensor/computer) source failure.

UGB13131 - U7ST0M0 - UM31D4000000001



EIS ABNORMAL OPERATION

EIS ABNORMAL OPERATION (3)

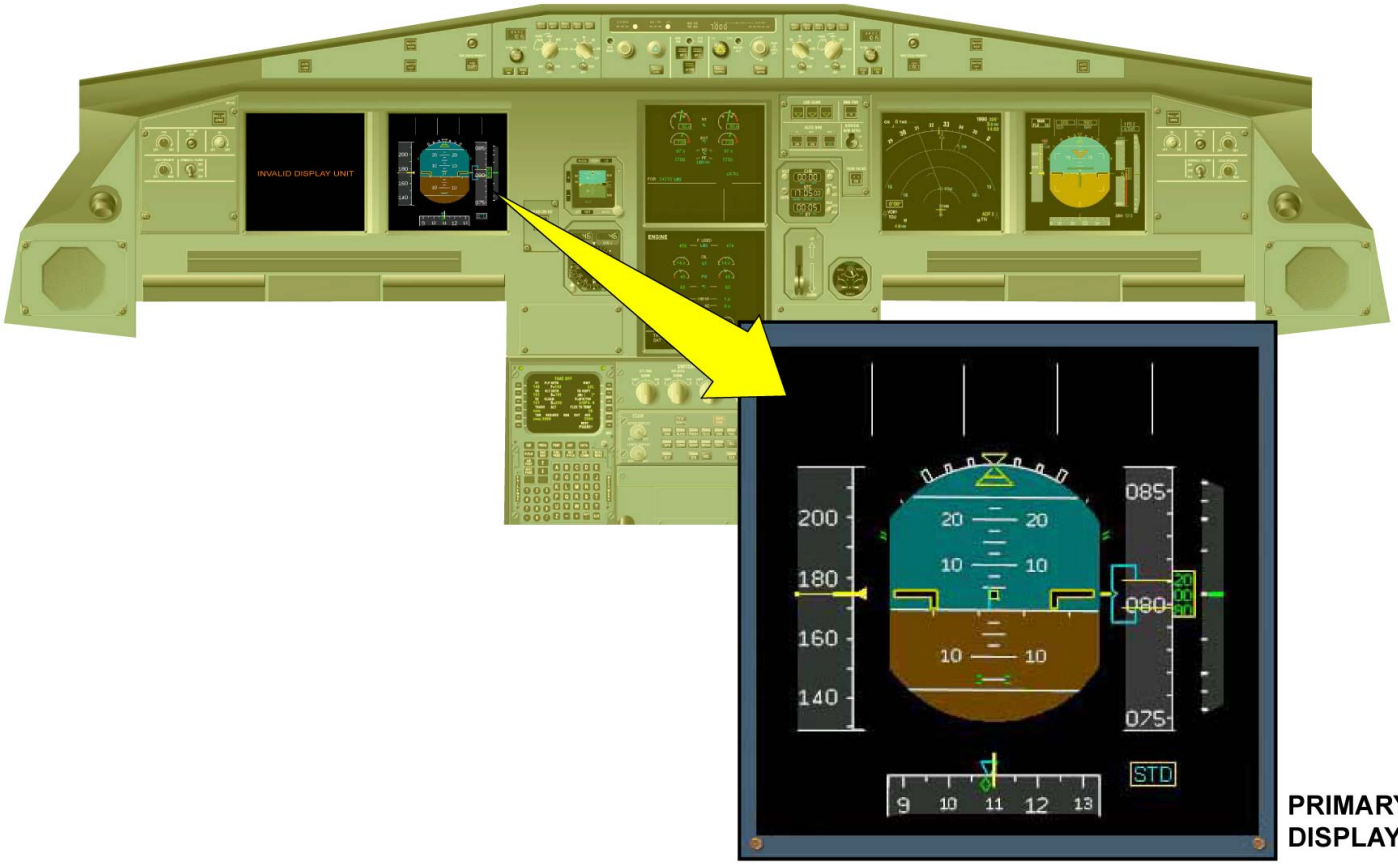
SINGLE OR MULTIPLE FAILURE

Many failures could occur on the EIS like:
- Primary Flight Display (PFD),
- Navigation Display (ND),
- Electronic Centralized Aircraft Monitoring (ECAM) Upper or lower DU,
- Multiple DU,
- ECAM Control Panel (ECP),
- System Data Acquisition Concentrator (SDAC),
- Flight Warning Computer (FWC),
- DMC.

PFD DU FAILURE

In the case of PFD failure (detected) or if the PFD unit is switched off by means of its potentiometer, the PFD is automatically displayed on the ND unit.

UGB13131 - U7ST0M0 - UM31D4000000001



PRIMARY FLIGHT DISPLAY (PFD)

SINGLE OR MULTIPLE FAILURE - PFD DU FAILURE

EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

PFD DU FAILURE (PFD/ND XFR)

The PFD/ND transfer (XFR) P/BSW provides the crew with the possibility to recover the ND image on the ND unit, if necessary. Display change is performed by software switching of the PFD/ND outputs inside the DMC.

UGB13131 - U7ST0M0 - UM31D4000000001

SINGLE OR MULTIPLE FAILURE - PFD DU FAILURE (PFD/ND XFR)

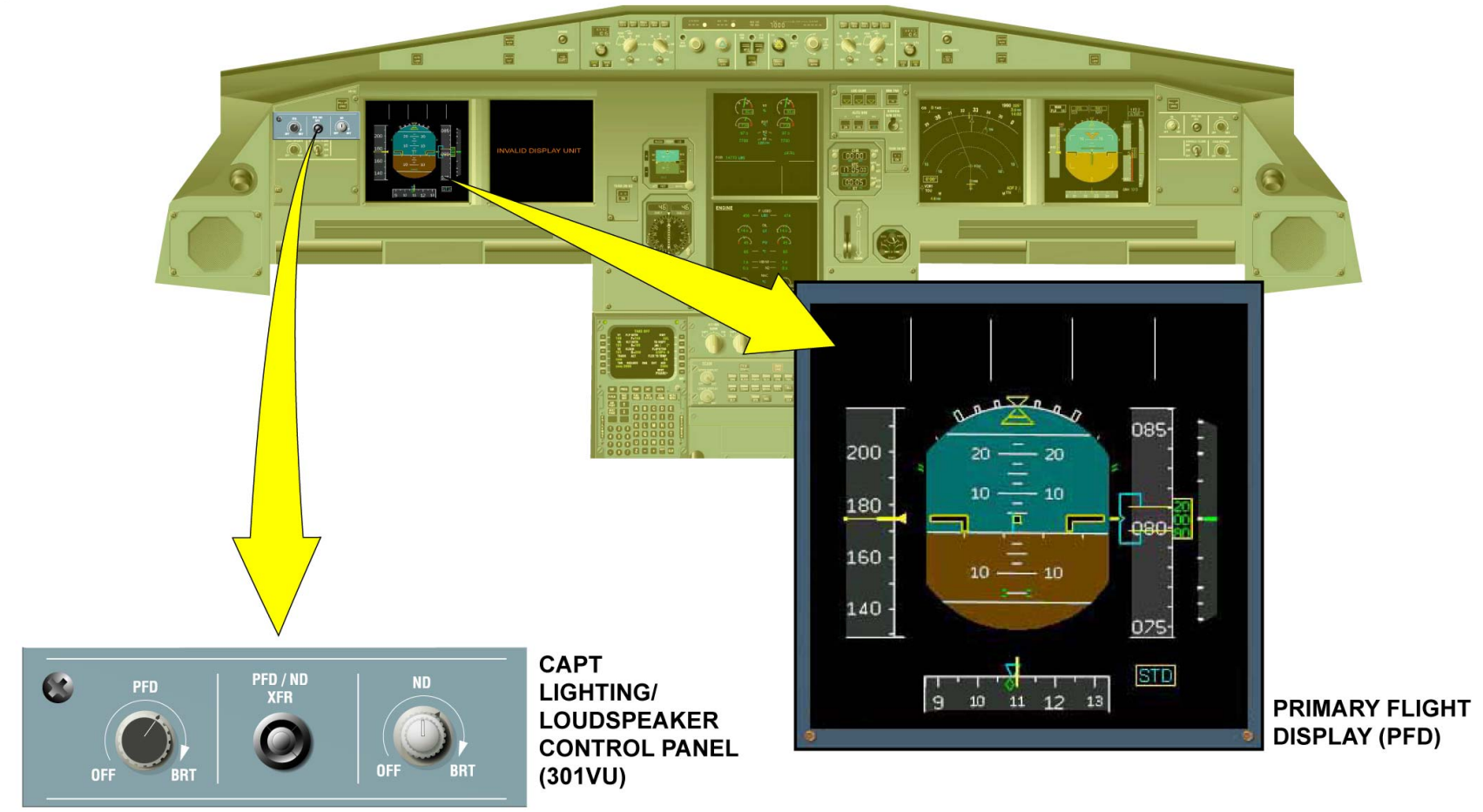
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

ND DU FAILURE

In the case of ND unit failure the crew has the possibility to present the ND image by pressing the PFD/ND XFR P/BSW.

UGB13131 - U7ST0M0 - UM31D4000000001



SINGLE OR MULTIPLE FAILURE - ND DU FAILURE

EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

ND DU FAILURE (PFD/ND XFR)

The ND screen stays instead of the PFD screen until the PFD/ND XFR P/BSW is pressed again.

UGB13131 - U7ST0M0 - UM31D4000000001

SINGLE OR MULTIPLE FAILURE - ND DU FAILURE (PFD/ND XFR)

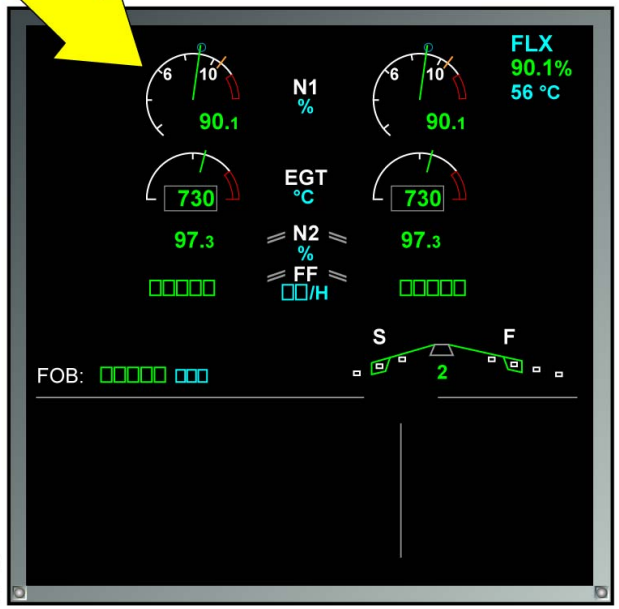
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

UPPER ECAM DU FAILURE

In the case of an upper display (EWD) failure or if the upper display control potentiometer is turned to off, the upper display is automatically transferred on the lower display, this mode is called ECAM single display mode.

UGB13131 - U7ST0M0 - UM31D4000000001



ENGINE/WARNING DISPLAY (EWD)

Parameters are given for a CFM engine or a PW engine. For an IAE engine, the parameters will be shown as follows: Engine Pressure Ratio (EPR), EGT, N1, N2.

SINGLE OR MULTIPLE FAILURE - UPPER ECAM DU FAILURE

EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

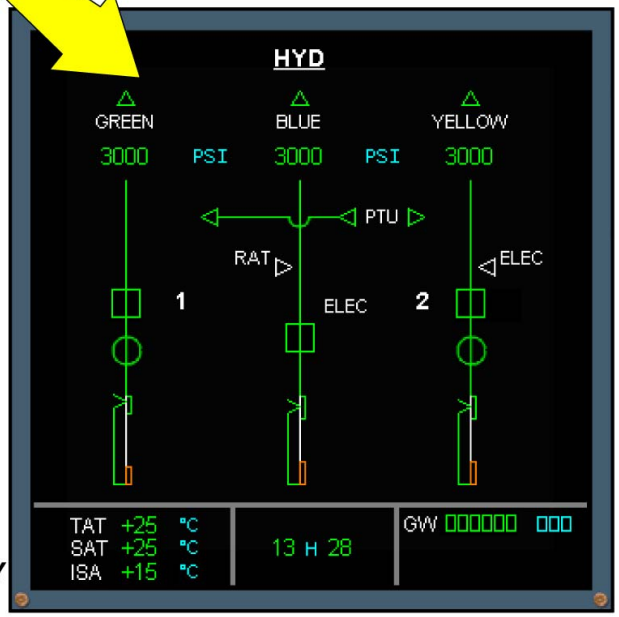
UPPER ECAM DU FAILURE (SYSTEM PAGE RECOVERING)

In this case a system page can be recovered by pushing and holding a system key on the ECP or by rotating the ECAM/ND XFR selector on the switching panel in order to display the system page on the ND side.

UGB13131 - U7ST0M0 - UM31D4000000001

ECAM CONTROL PANEL (11VU)

SYSTEM DISPLAY (SD) (HYD PAGE)



SINGLE OR MULTIPLE FAILURE - UPPER ECAM DU FAILURE (SYSTEM PAGE RECOVERING)

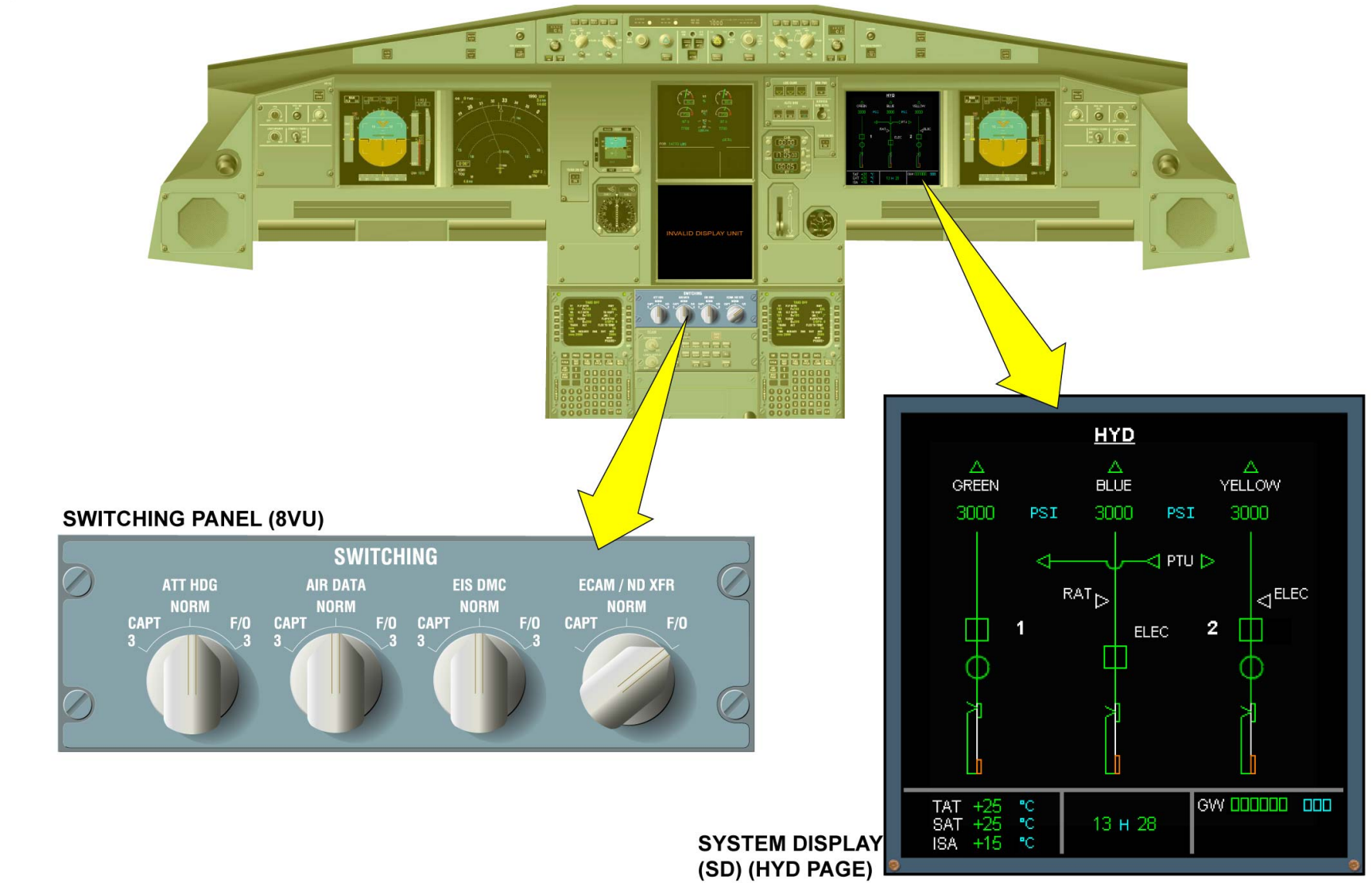
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

LOWER ECAM DU FAILURE

In case of lower DU failure or if the lower display is turned to off, no automatic reconfiguration is possible, the ECAM works in single display mode. Each crew member also has the possibility to present the SD image on the ND side only, and never on the PFD side, by rotating the ECAM/ND transfer selector switch on the switching panel.

UGB13131 - U7ST0M0 - UM31D4000000001



SINGLE OR MULTIPLE FAILURE - LOWER ECAM DU FAILURE

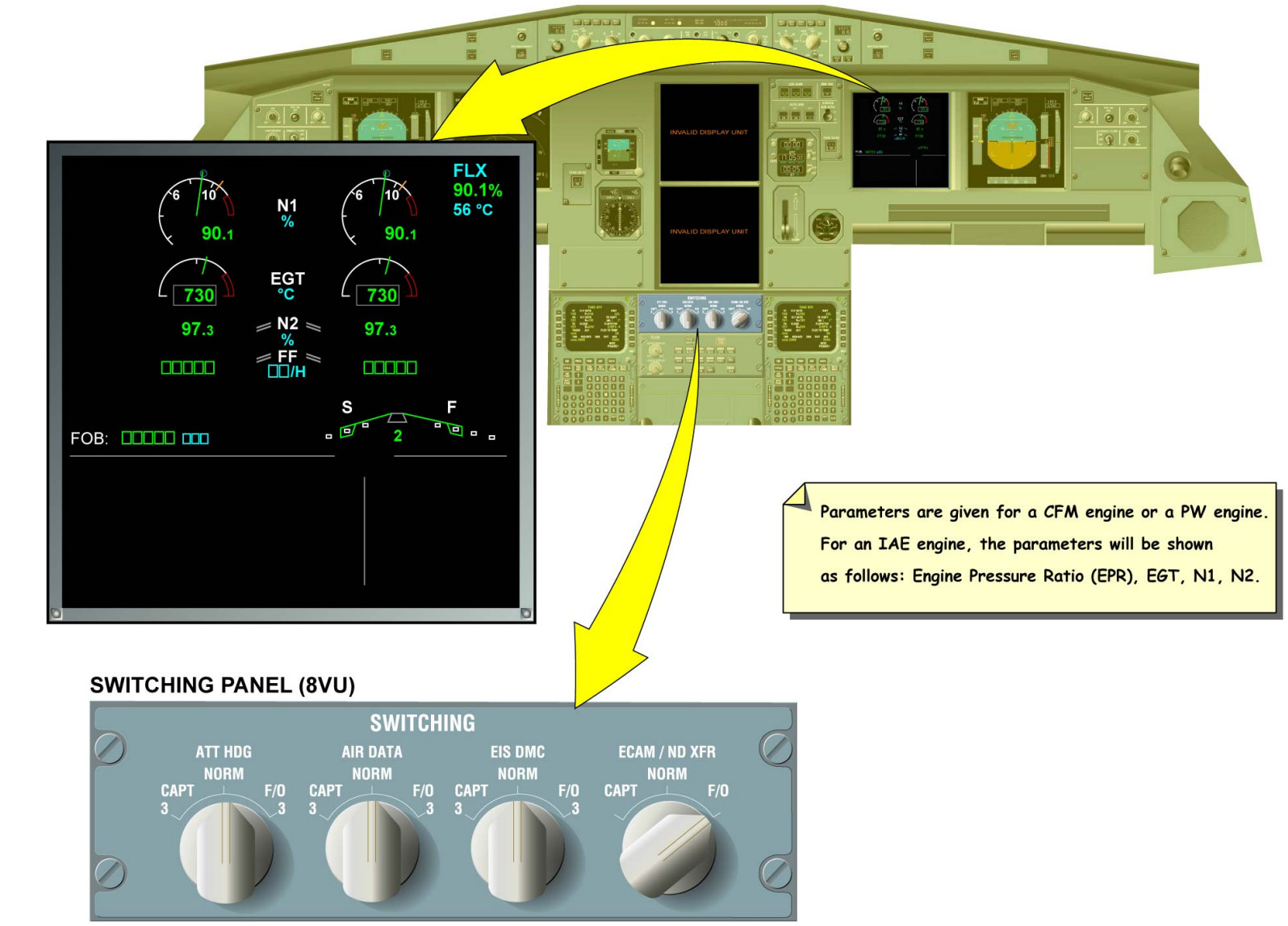
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

BOTH ECAM DU FAILURE (ECAM ND XFR)

In case of EWD unit and SD unit failure, each crew member has the possibility to permanently present the EWD on the ND unit by rotating the ECAM/ND transfer selector switch on the switching panel.

UGB13131 - U7ST0M0 - UM31D4000000001



SINGLE OR MULTIPLE FAILURE - BOTH ECAM DU FAILURE (ECAM ND XFR)

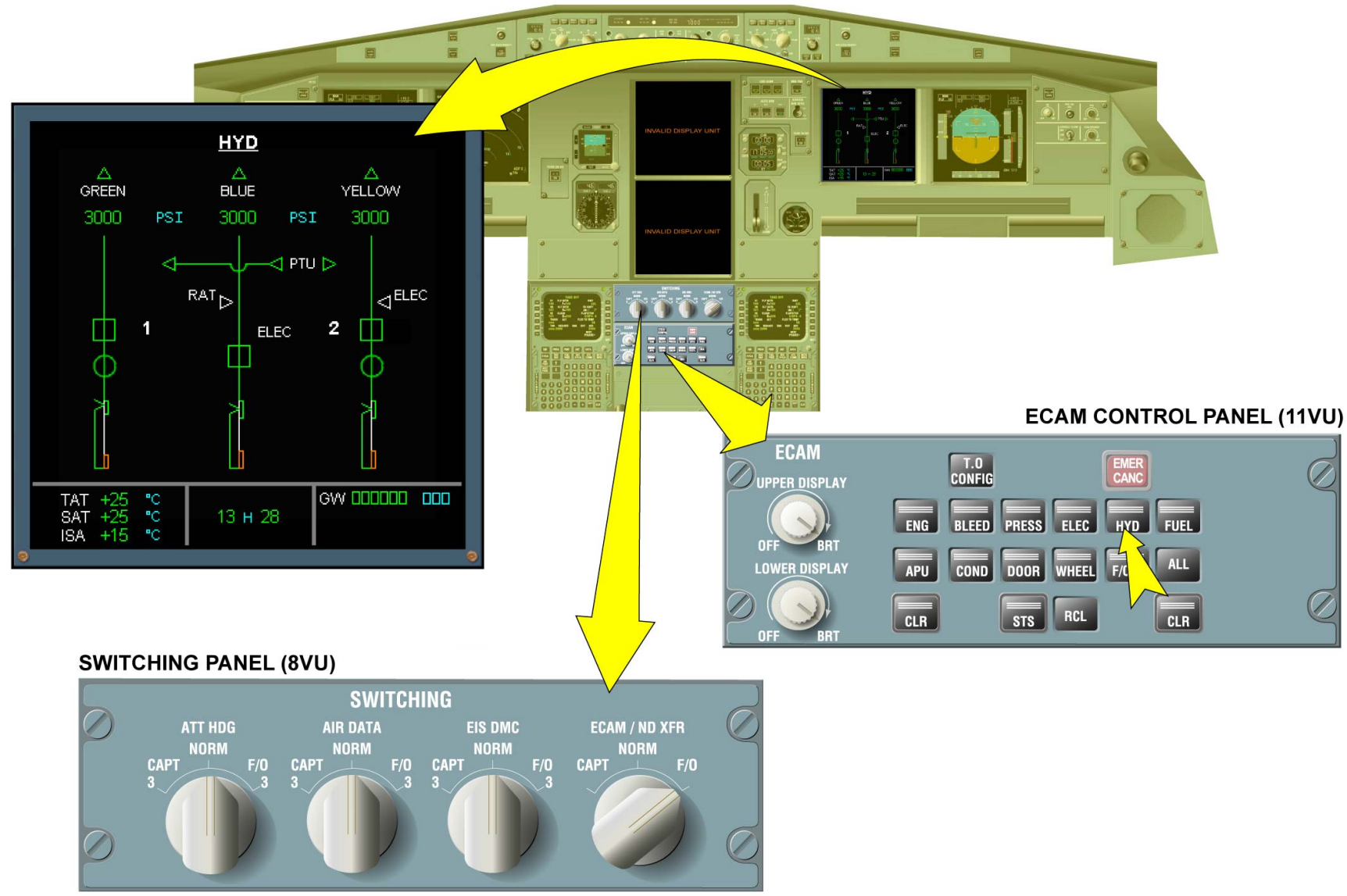
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

BOTH ECAM DU FAILURE (SYSTEM PAGE RECOVERING)

It is still possible to recover a system page by pushing and holding a system key on the ECP.

UGB13131 - U7ST0M0 - UM31D4000000001



SINGLE OR MULTIPLE FAILURE - BOTH ECAM DU FAILURE (SYSTEM PAGE RECOVERING)

EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

MULTIPLE DU FAILURE (SAME SIDE)

In the case of PFD unit and ND unit failure (on the same side) no reconfiguration is possible.

UGB13131 - U7ST0M0 - UM31D4000000001

SINGLE OR MULTIPLE FAILURE - MULTIPLE DU FAILURE (SAME SIDE)

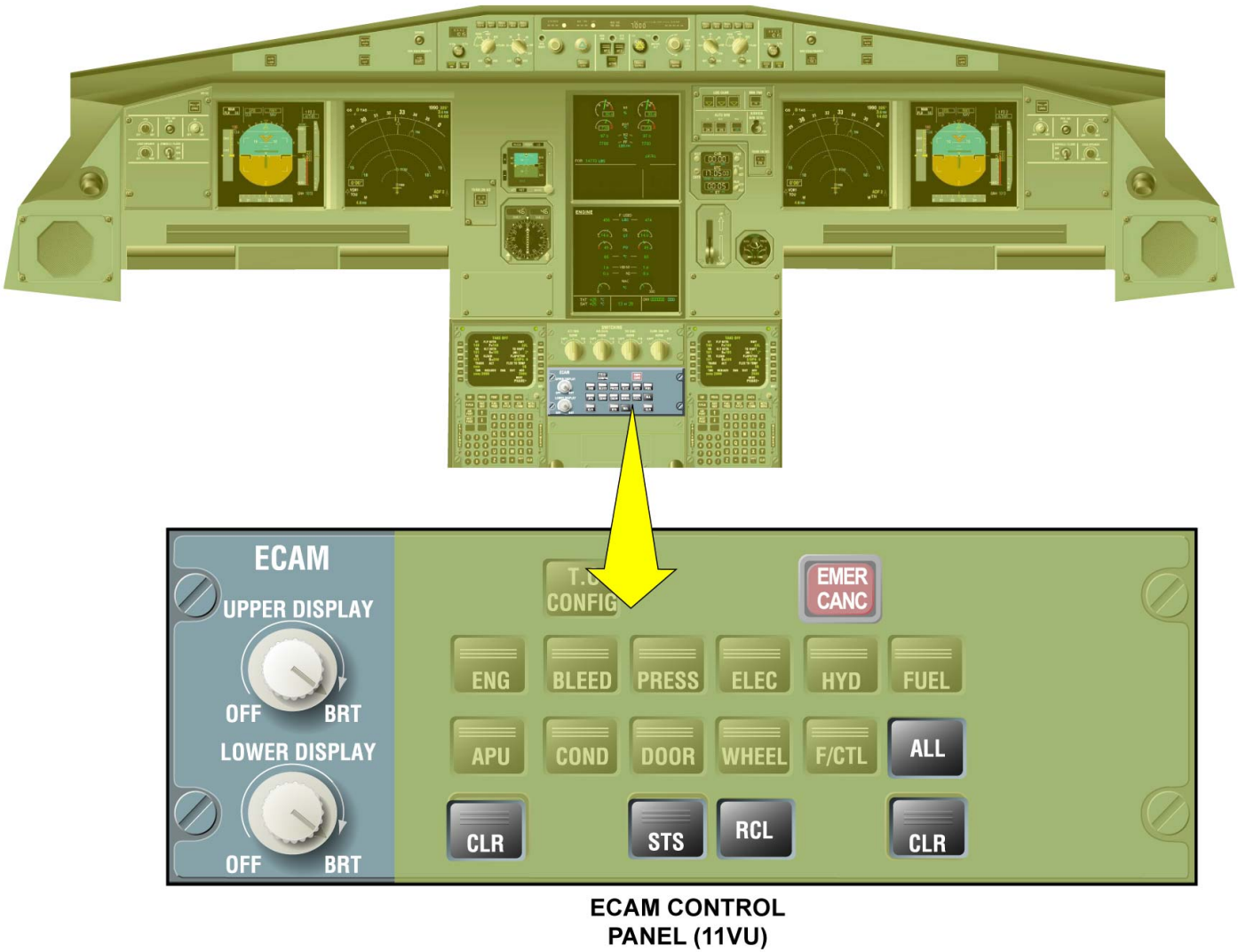
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

ECAM CONTROL PANEL FAILURE

If the ECP fails, the main functions, emergency cancel (EMER CANC), clear (CLR), recall (RCL), all (ALL) and status (STS) remain available.

UGB13131 - U7ST0M0 - UM31D4000000001



ECAM CONTROL PANEL (11VU)

SINGLE OR MULTIPLE FAILURE - ECAM CONTROL PANEL FAILURE

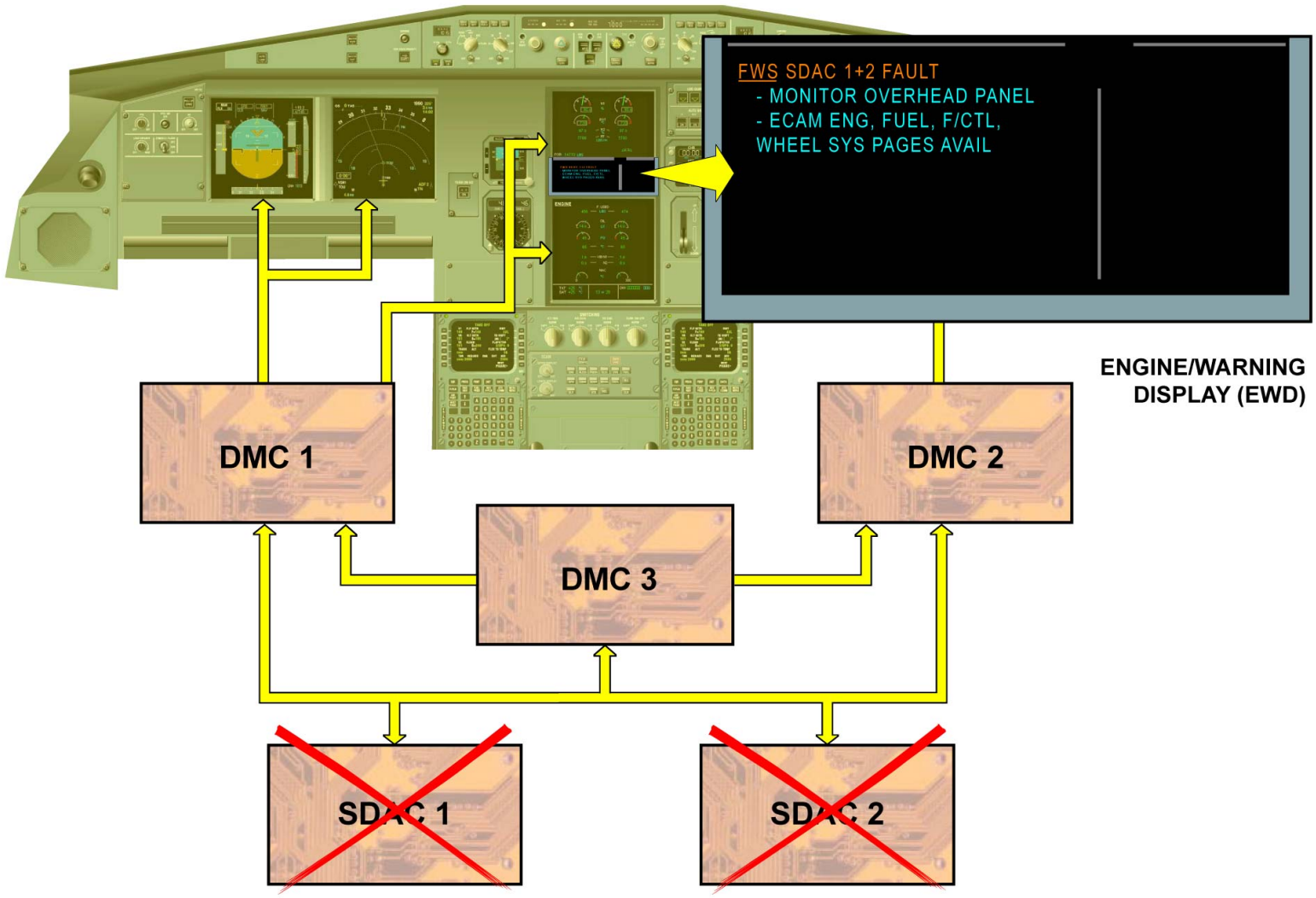
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

SDAC FAILURE

In the case of a SDAC failure, there is no operational consequence due to the redundancy of the EIS, the following message is displayed on the EWD: FWS SDAC 1 (or SDAC 2) FAULT.
In case both SDACs fail the amber cautions and most of the system displays are lost. The following message is displayed on the EWD: FWS SDAC 1+2 FAULT. ENG, FUEL, F/CTL and WHEEL ECAM page data is available because it is already in ARINC 429 format and not affected by SDAC failure.

UGB13131 - U7ST0M0 - UM31D4000000001



SINGLE OR MULTIPLE FAILURE - SDAC FAILURE

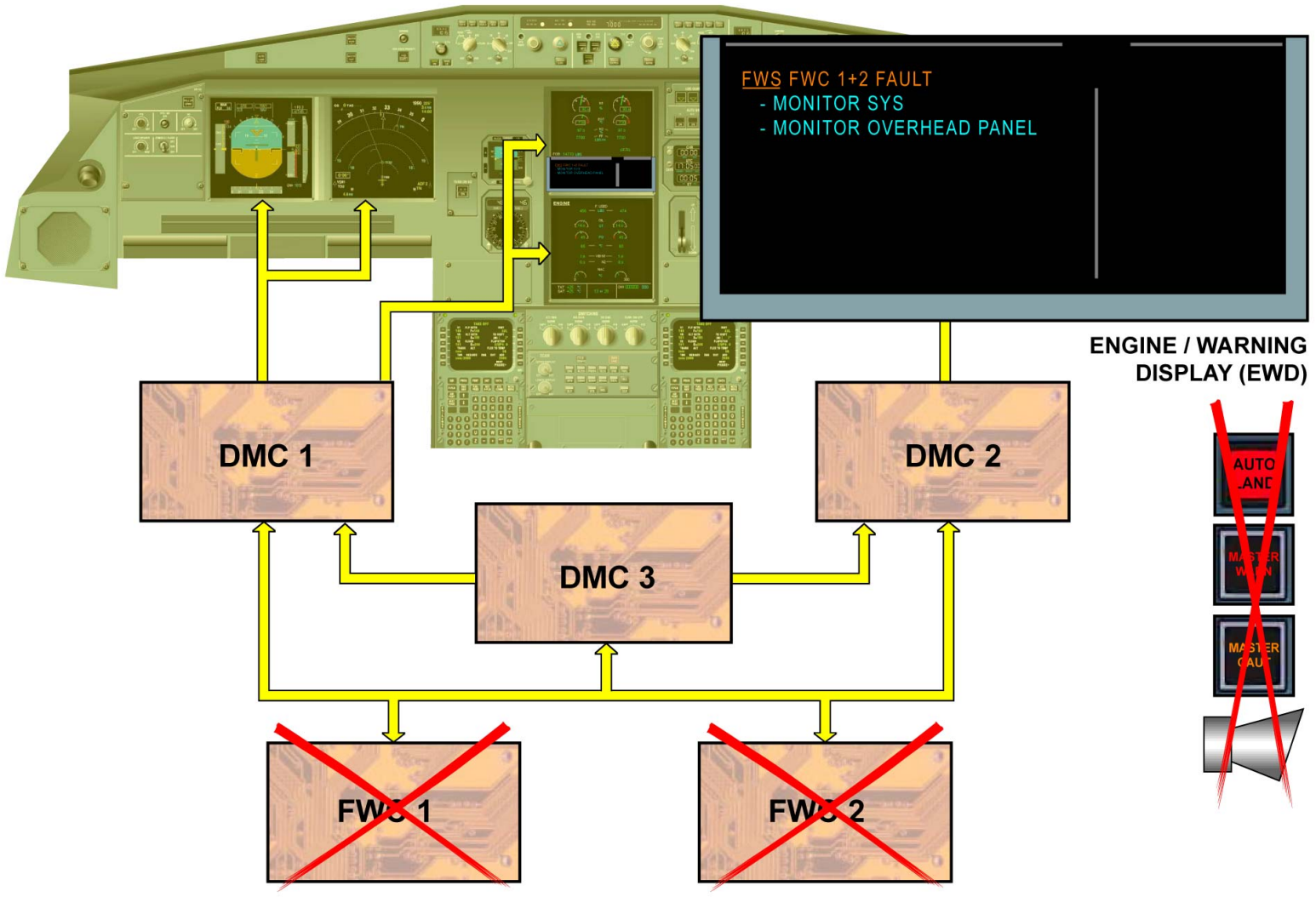
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

FWC FAILURE

In the case of a FWC failure, there is no operational consequence due to the redundancy of the EIS, the following message is displayed on the EWD: FWS FWC1 FAULT or FWS FWC2 FAULT. All attention getters and loudspeakers remain operative.
If the DMCs receive no valid data from both FWCs, the message FWS FWC1 + 2 FAULT is displayed on the EWD. All other EWD messages, aural warnings and attention getters are lost.

UGB13131 - U7ST0M0 - UM31D4000000001



SINGLE OR MULTIPLE FAILURE - FWC FAILURE

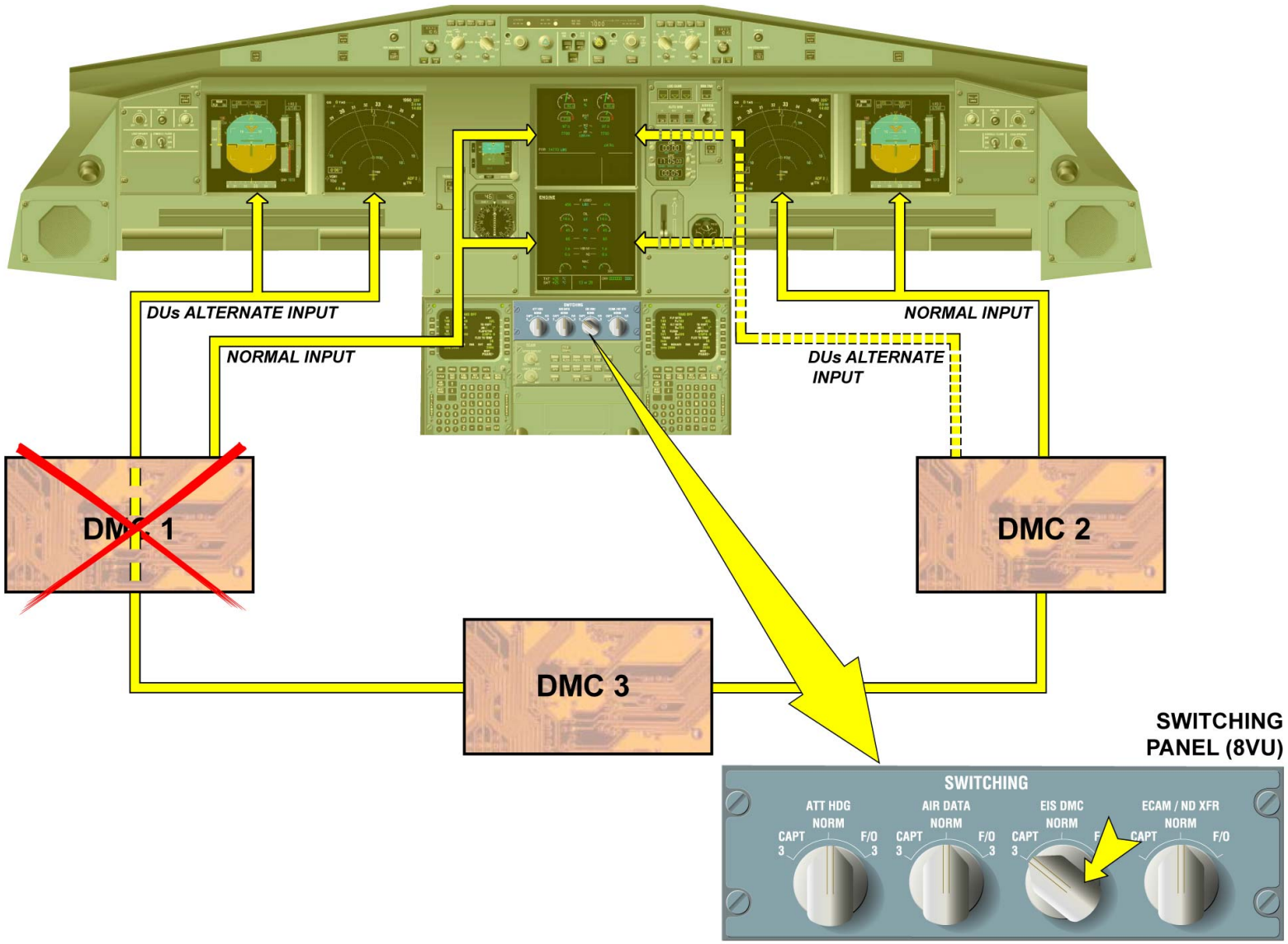
EIS ABNORMAL OPERATION (3)

SINGLE OR MULTIPLE FAILURE (continued)

DMC FAILURE

If DMC1 fails, DMC2 will automatically drive the ECAM DUs. The CAPT has to switch to DMC3 by rotating the EIS DMC switch on the switching panel to CAPT3 in order to recover also EFIS DUs through DMC3. If DMC 2 fails, the F/O has to switch to DMC3 by rotating the EIS DMC switch on the switching panel to F/O 3. Either the CAPT or the F/O may select the DMC3.

UGB13131 - U7ST0M0 - UM31D4000000001



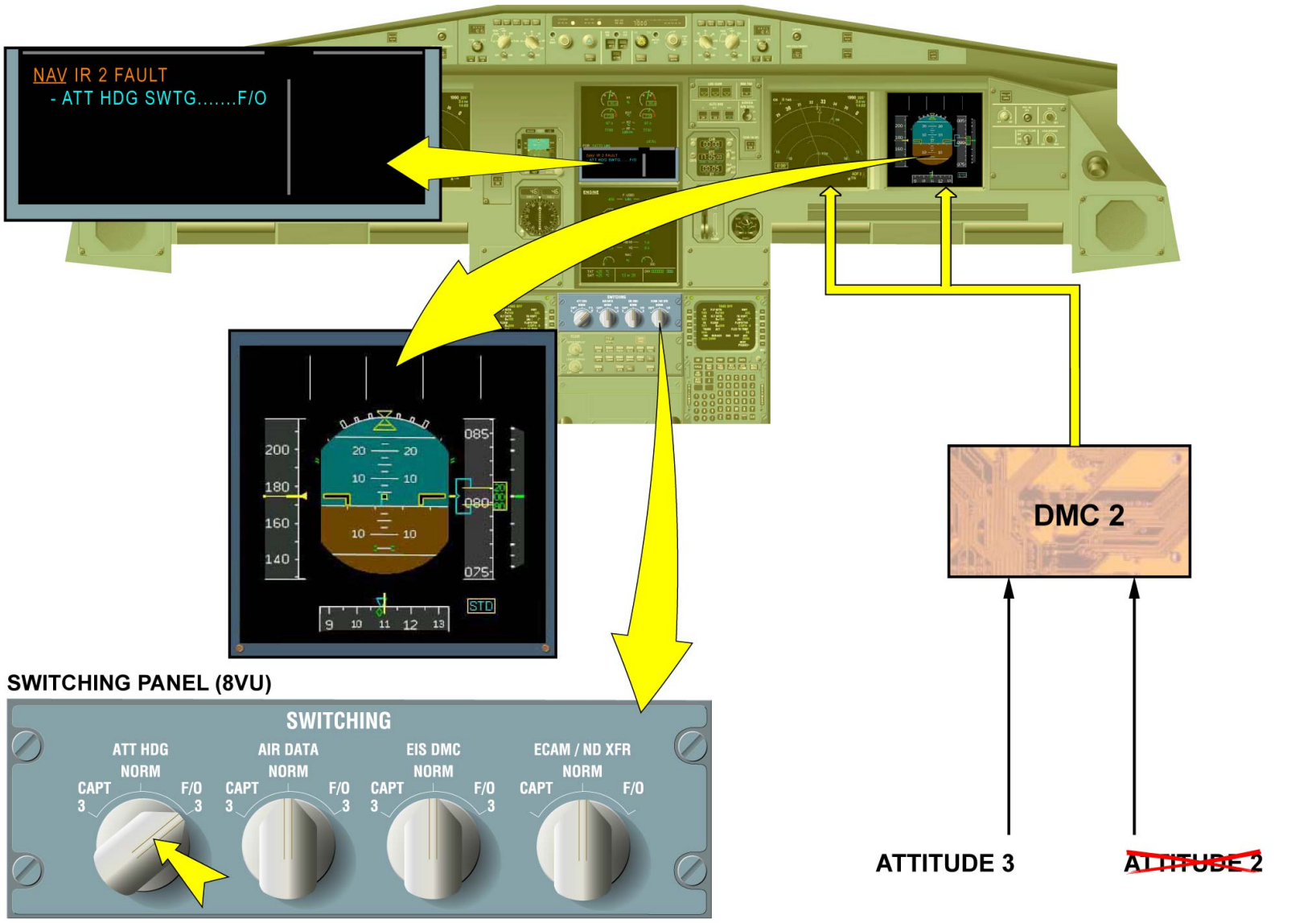
SINGLE OR MULTIPLE FAILURE - DMC FAILURE

EIS ABNORMAL OPERATION (3)

EXTERNAL SOURCE INFORMATION FAILURES

In the case of external source information failures, the lost information appears in red on the PFD or ND. It is possible to recover certain information by following the EWD instructions: in this example "ATT HDG SWTG F/O" on the switching panel. This enables manual source reconfiguration for attitude and heading data. On the EWD, the failed component is also displayed.

UGB13131 - U7ST0M0 - UM31D4000000001



EXTERNAL SOURCE INFORMATION FAILURES

INDICATING SYSTEM OPERATION, CONTROL & INDICATING (3)

ADVISORY MODE

INDEPENDENT, PRIMARY and SECONDARY FAILURE

FAILURE CLASSIFICATION and CFDS MENU in FLIGHT

SDAC and FWC Failure + ATA Review

UGB13131 - U7ST0M0 - UM31IZLEVEL0302

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UGB13131 - U7ST0M0 - UM31IZLEVEL0302

ELECTRICAL CLOCK D/O (2)

AIR PRECISION CLOCK

TEST

To test the clock, the annunciator light switch must be set to TEST. Then all the displays should show eight.

UTC AND DATE

When the clock is in normal configuration it displays the time. The date is displayed by pressing the SET turn and P/B when the time of the day is displayed. By pressing the SET turn and P/B once more the time of the day will be displayed again.

UTC SETTING

The setting of the Universal Time coordinated (UTC) is done with the UTC selector. When the selector is in SET position, the second digits are blanked, the minute digits flash and the hour digits are frozen. By rotating the SET button clockwise the minutes increase, anticlockwise the minutes decrease. By pushing the SET button the hours flash, the minutes are frozen and the seconds are blanked. By turning the SET button, hours can be adjusted. When the UTC selector is moved from SET to INT the clock starts running from the adjusted time with the second digits at 00. When the UTC selector is in Global Positioning System (GPS) position, the clock is synchronized on the GPS time, if a GPS signal is present.

DATE SETTING

The setting of the date is done with the UTC selector. By pressing the SET button, the date is displayed. By setting the UTC selector in SET position, the year digits flash and the month and day digits are frozen. By turning the SET button clockwise or anticlockwise, years can be modified to obtain the chosen value. By pushing the SET button, the months and days can be adjusted in the same way.

CHRONOMETER

A first press on the CHRonometer P/B starts the chronometer, a second press stops it and freezes the display, and a press on the ReSeT P/B resets it.

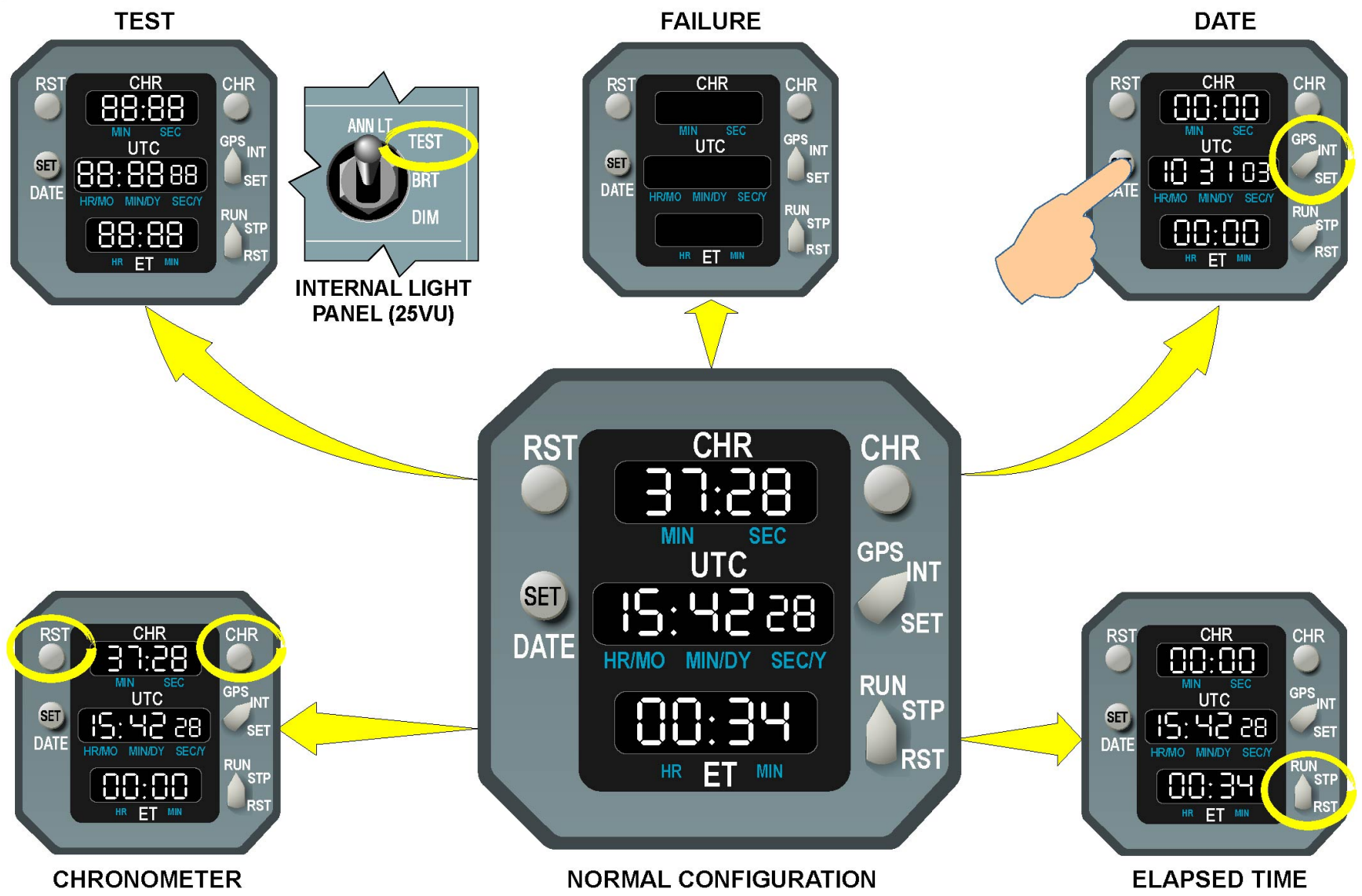
ELAPSED TIME

To activate the Elapsed Time (ET) function, the ET selector must be set to RUN. When set to STP, the ET counter stops, and the display is frozen. To reset the display, the selector must be set to RST (spring loaded position) and it returns to STP.

FAILURE

With a clock failure or a loss of power supply, the digital displays are no longer available. With a loss of main electrical power supply, the time is still counted in memory through the A/C battery supply, except for the CHR and ET functions.

UGB13131 - U7ST0M0 - UM31D6000000001



AIR PRECISION CLOCK - TEST ... FAILURE

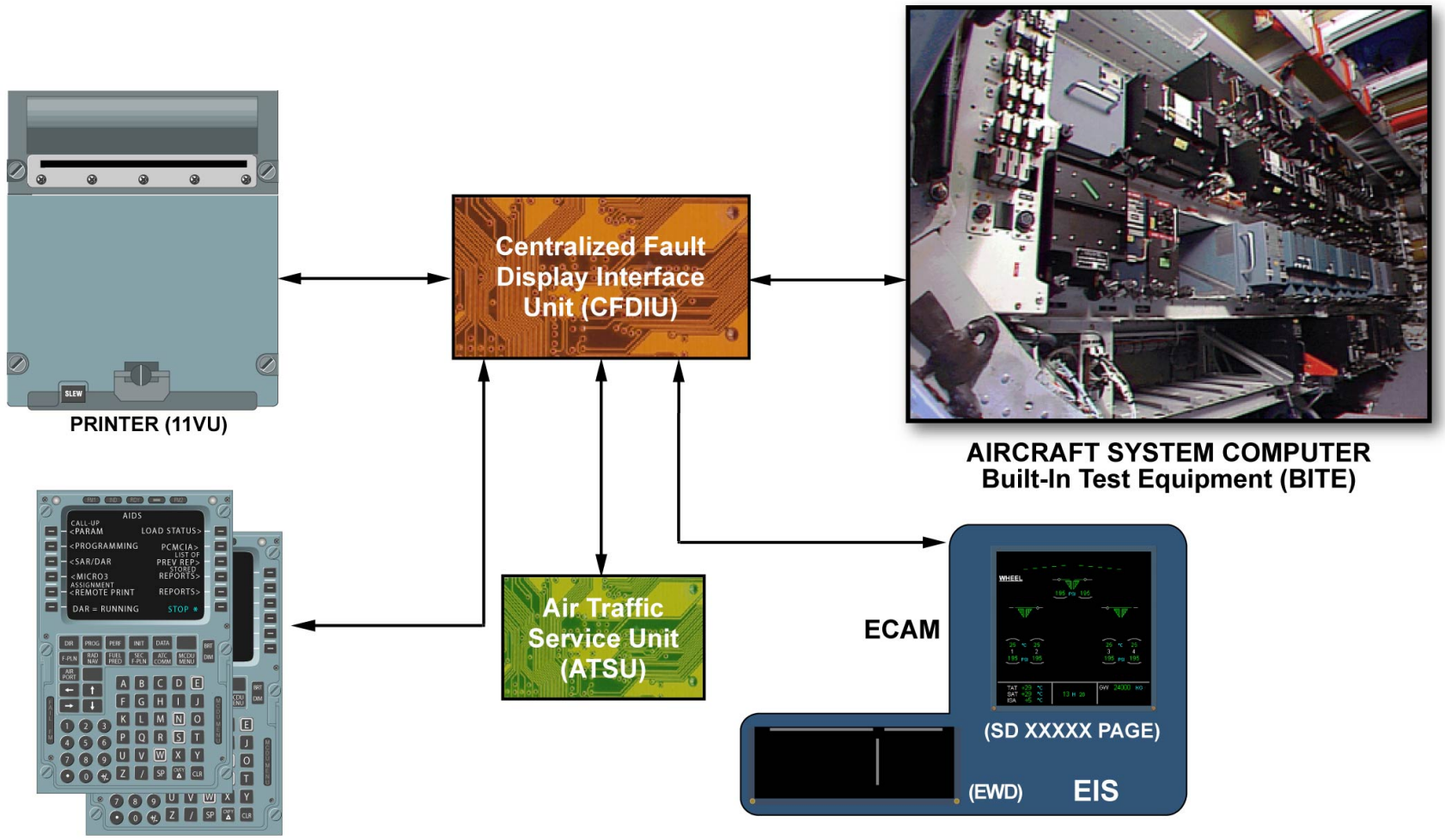
UGB13131 - U7ST0M0 - UM31D600000001

CFDS COMPONENT LOCATION (2)

SYSTEM OVERVIEW

The Centralized Fault Display Interface Unit (CFDIU) centralizes and memorizes all information concerning A/C system failures. Reading or printing of the failure information is done in the cockpit with any MCDU or the printer. Most A/C system computers have a BITE. The BITE permanently monitors the system operation. When a failure is detected, it is stored in the BITE memory and is transmitted to the CFDIU. The ECAM, which generate warning and status messages, delivers these data to the CFDIU as well.

UGB13131 - U7ST0M0 - UM31C2COMPLOC01



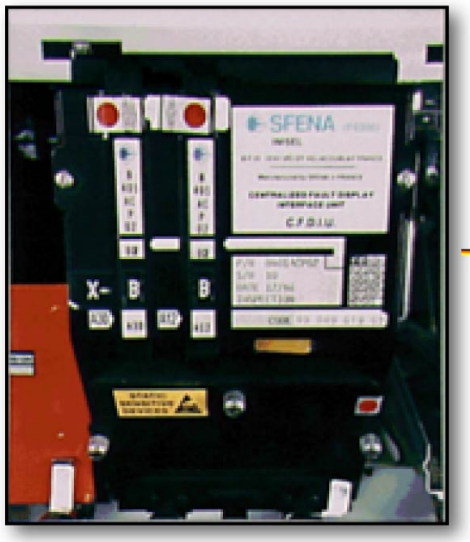
SYSTEM OVERVIEW

CFDS COMPONENT LOCATION (2)

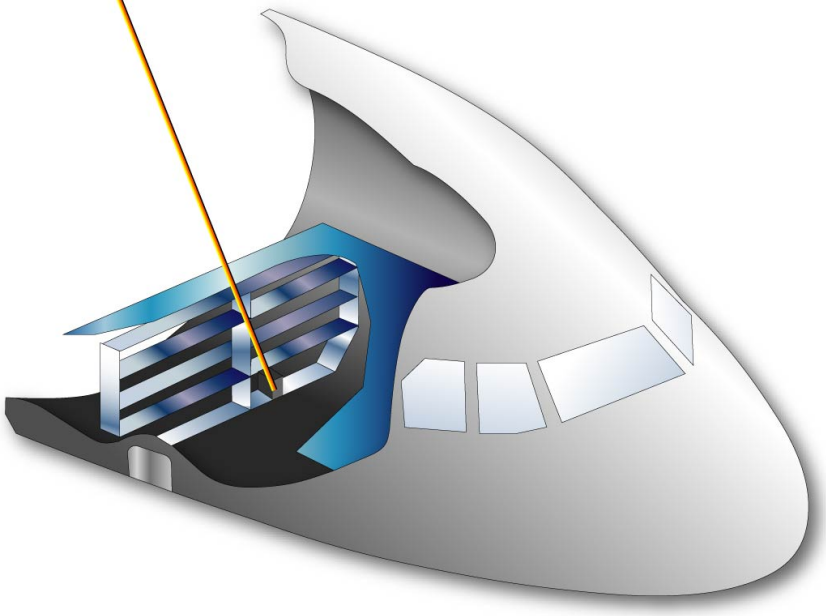
COMPONENT LOCATION

The Centralized Fault Display System (CFDS) computers are located in the aft avionics rack.

UGB13131 - U7ST0M0 - UM31C2COMPLOC01



Centralized Fault Display Interface Unit (CFDIU)



COMPONENT LOCATION

CFDS FAULT PROCESSING (3)

BITE

Most aircraft system computers are equipped with a Built-In Test Equipment (BITE). The BITE, which is an electronic device (hard + soft), monitors permanently the system operation. When a failure is detected, it is stored in the BITE memory and is transmitted to the Centralized Fault Display Interface Unit (CFDIU). Memorization of the 64 previous legs report is done by most of the BITEs.

MEMORIZATION

Memorization of failures is different when the aircraft is on ground or in flight. The full BITE functions and memorization operate in flight.
On ground, the memorization is done only in the BITEs. The BITEs are provided with flight and ground memory zones.

CFDIU

The CFDIU centralizes all information concerning aircraft system failures. Reading or printing of all the failure information is done in the cockpit.
The Centralized Fault Display System (CFDS = CFDIU + BITEs) functions are accessed through the MCDUs.
The Flight Warning Computers (FWCs) send the ECAM messages to the CFDIU by ARINC429 data busses. The CFDIU will memorize these messages to generate the CURRENT LEG/LAST LEG ECAM REPORT.

CFDS MODES

Two CFDS modes are available: NORMAL and MENU modes. The MENU MODE is available only on ground.

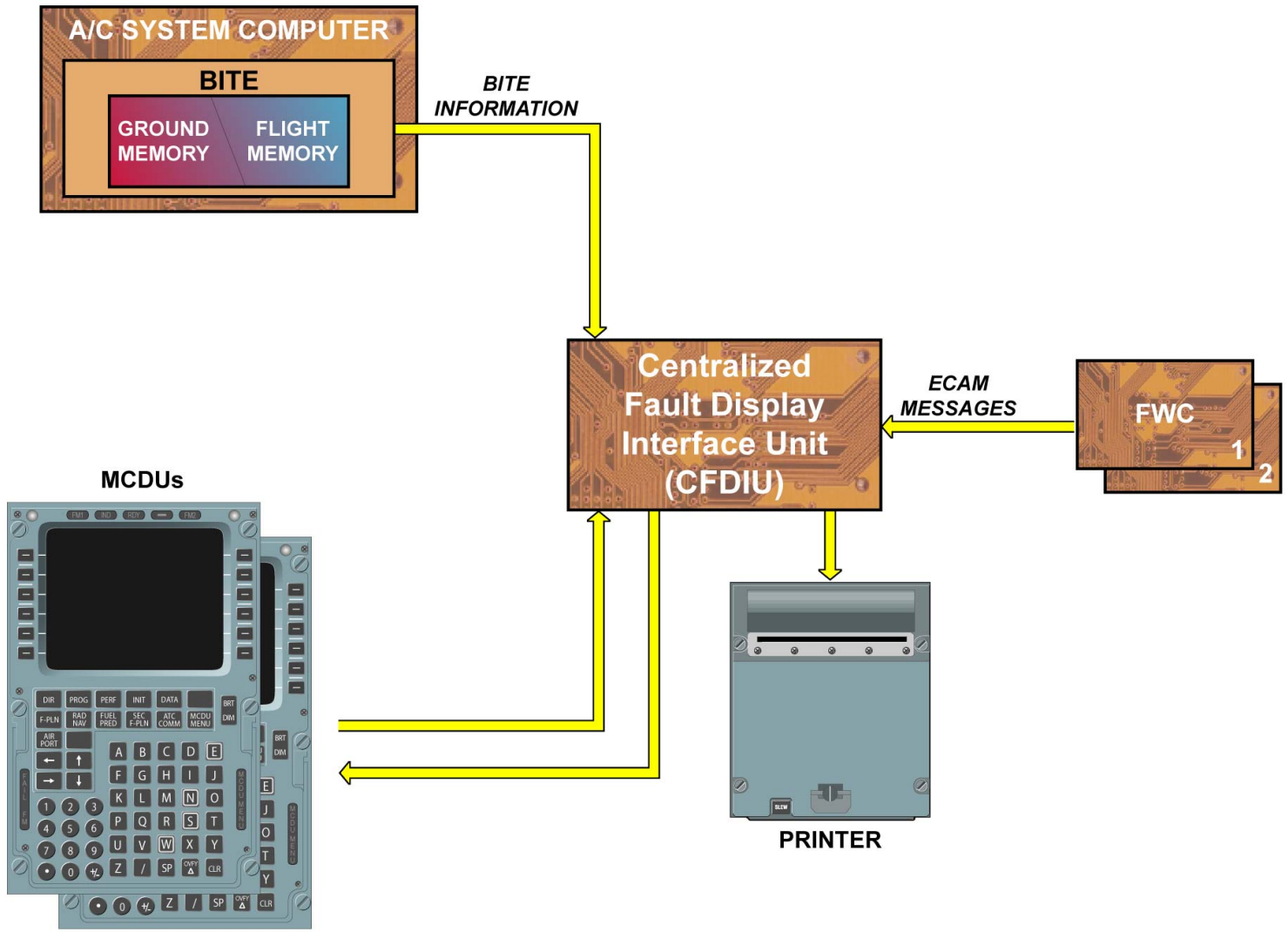
NORMAL MODE

In this mode, the CFDIU scans all the connected system outputs and memorizes the failure messages in order to generate the CURRENT (LAST) LEG REPORT and the CURRENT (LAST) LEG ECAM REPORT. In flight the CFDS always operates in the normal mode.

MENU MODE

In this mode, the CFDIU dialogues with one computer at a time in order to read the contents of its BITE memory and to initiate various tests. This mode can only be selected on ground and interrupts the normal mode of operation.

UGB13131 - U7ST0M0 - UM31D7000000001



BITE ... CFDS MODES

CFDS FAULT PROCESSING (3)

REPORTS

LAST/CURRENT LEG REPORT

A CURRENT LEG REPORT is elaborated during the flight. After the flight, its title becomes LAST LEG REPORT. The purpose of this item is to present the failure messages, concerning all systems, occurred during the last/current flight. Each message contains the test of the failure, the ATA reference and the flight phase and time at which the failure occurred. A function correlates the "SOURCE" failure message with the "resulting" failure messages.
SOURCE: Name of system affected by a failure.
IDENTIFIER: Name of system affected by an external failure, which is correlated with the "SOURCE" failure.
The CFDIU capacity for failure messages memorization is up to 40 lines.

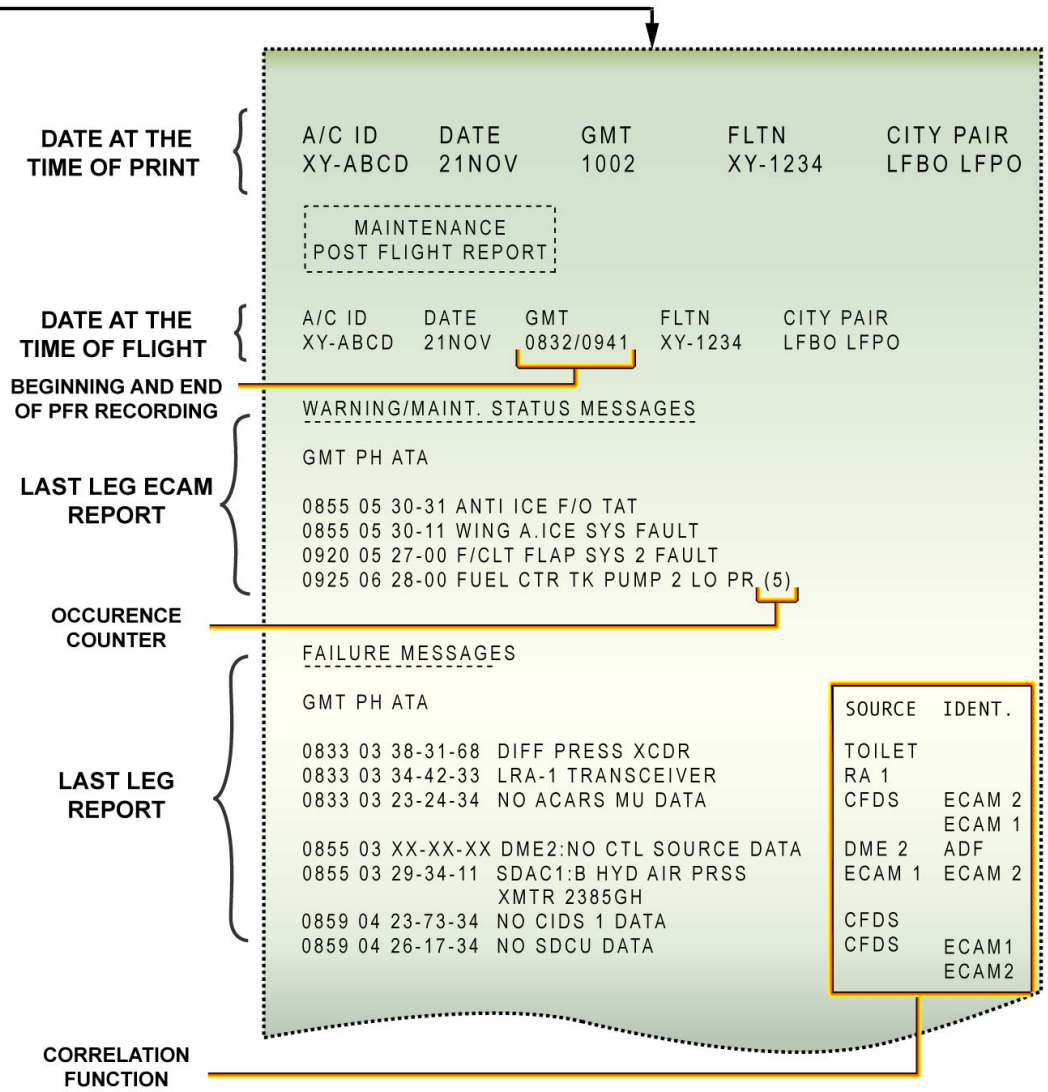
LAST/CURRENT LEG ECAM REPORT

A CURRENT LEG ECAM REPORT is elaborated during the flight. After the flight, its title becomes LAST LEG ECAM REPORT. The purpose of this item is to present the warning messages displayed on the upper ECAM display unit during the last/current flight. These are primary or independent warnings. Each message contains the ECAM warning, the ATA reference and the flight phase and time at which the warning was triggered. When several identical and consecutive warnings are transmitted, the CFDIU memorizes the first occurrence only and carries on counting with a maximum of 8. The occurrence counter is displayed between brackets at the end of the message. The CFDIU capacity for warning messages memorization is up to 40 lines.

POST FLIGHT REPORT

The Post Flight Report (PFR) is the sum of the LAST LEG REPORT and of the LAST LEG ECAM REPORT. The PFR can only be printed on ground. The list of ECAM WARNING MESSAGES and FAULT MESSAGES with the associated time, flight phase and ATA reference allow the maintenance crew to make a correlation for easier trouble-shooting.
Beginning of PFR recording:
- if flight number inserted prior to first engine start, first engine started + 3 minutes.
- if not, aircraft speed > 80 knots.

End of PFR recording:
Aircraft speed < 80 knots + 30 seconds.


DATE AT THE TIME OF PRINT
A/C ID DATE GMT FLTN CITY PAIR
XY-ABCD 21NOV 1002 XY-1234 LFBO LFPO
MAINTENANCE
POST FLIGHT REPORT
DATE AT THE TIME OF FLIGHT
A/C ID DATE GMT FLTN CITY PAIR
XY-ABCD 21NOV 0832/0941 XY-1234 LFBO LFPO
BEGINNING AND END OF PFR RECORDING
WARNING/MAINT. STATUS MESSAGES
LAST LEG ECAM REPORT
GMT PH ATA
0855 05 30-31 ANTI ICE F/O TAT
0855 05 30-11 WING A.ICE SYS FAULT
0920 05 27-00 F/CLT FLAP SYS 2 FAULT
0925 06 28-00 FUEL CTR TK PUMP 2 LO PR (5)
OCCURENCE COUNTER
FAILURE MESSAGES
LAST LEG REPORT
GMT PH ATA
0833 03 38-31-68 DIFF PRESS XCDR
0833 03 34-42-33 LRA-1 TRANSCEIVER
0833 03 23-24-34 NO ACARS MU DATA
0855 03 XX-XX-XX DME2:NO CTL SOURCE DATA
0855 03 29-34-11 SDAC1:B HYD AIR PRSS XMTR 2385GH
0859 04 23-73-34 NO CIDS 1 DATA
0859 04 26-17-34 NO SDCU DATA
SOURCE IDENT.
TOILET
RA 1
CFDS ECAM 2
ECAM 1
DME 2 ADF
ECAM 1 ECAM 2
CFDS
CFDS ECAM1
ECAM2
CORRELATION FUNCTION

REPORTS - LAST/CURRENT LEG REPORT ... POST FLIGHT REPORT

CFDS FAULT PROCESSING (3)

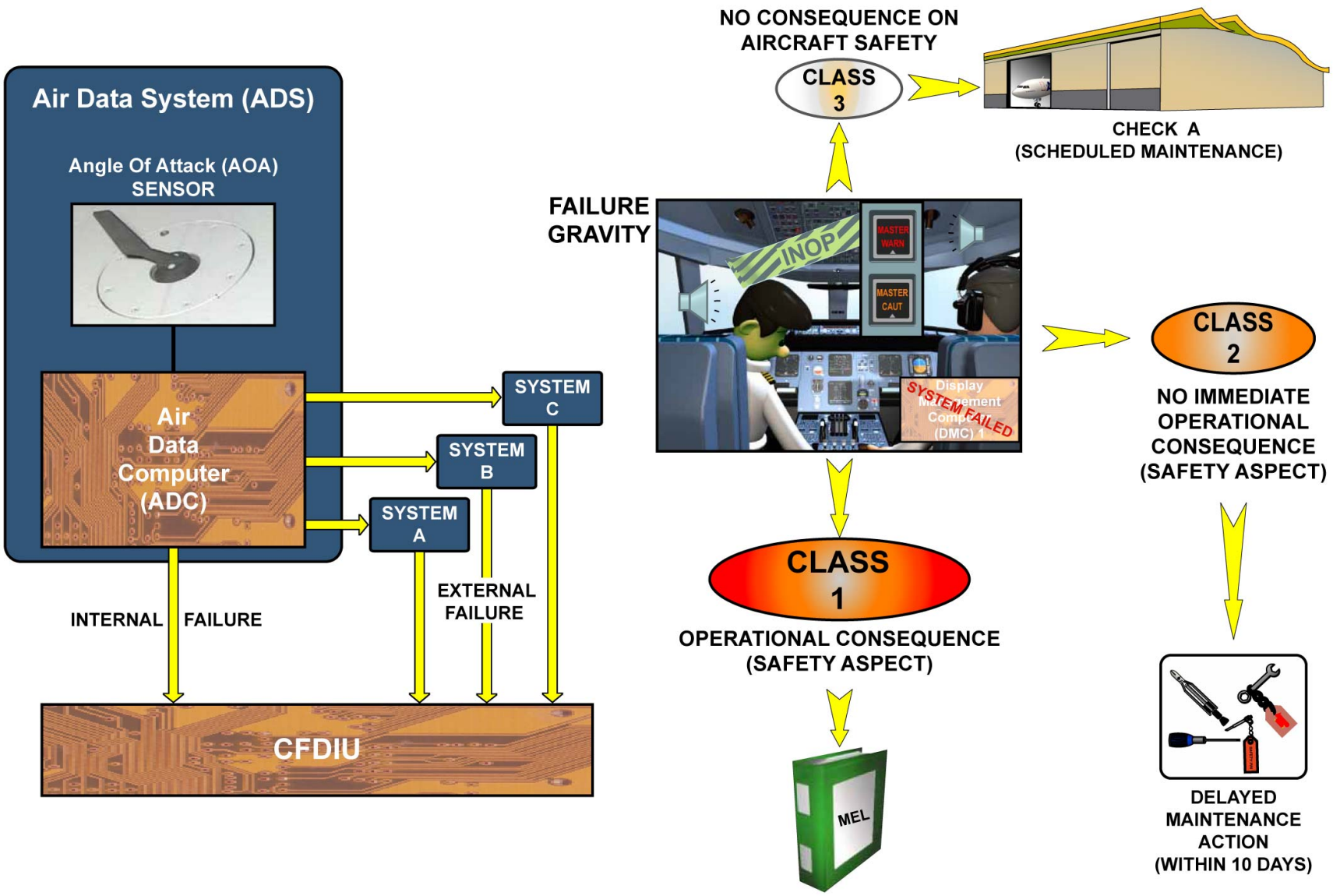
INTERNAL/EXTERNAL FAILURES

Each BITE can make the difference between an internal and an external failure. Let us suppose that an Angle-Of-Attack (AOA) sensor failure has been detected and that systems A, B and C are affected by this failure. The Air Data System (ADS) will transmit an internal failure while systems A, B and C will transmit an external failure.

FAILURE GRAVITY

The failures are classified according to their importance:
- class 1 failures are the most serious ones and require an immediate maintenance action subject to the Minimum Equipment List (MEL).
- class 2 failures may have consequences if a second failure occurs. A class 2 failure must be repaired within 10 days.
- class 3 failures can be left uncorrected until the next scheduled maintenance check.

UGB13131 - U7ST0M0 - UM31D7000000001



INTERNAL/EXTERNAL FAILURES & FAILURE GRAVITY

CFDS AIRCRAFT SYSTEM TYPES (2)

TYPE 1 SYSTEMS

Most systems are type 1 systems. These systems can memorize failures, which occurred in the last 64 flight legs. Type 1 systems are connected to the Centralized Fault Display Interface Unit (CFDIU) via an ARINC 429 input bus and an ARINC 429 output bus.

SINGLE COMPUTER

The first configuration in TYPE 1 is a single computer.
Example: VHF 1 Transceiver.

MULTI COMPUTER

The second configuration in TYPE 1 includes several computers in the same aircraft system. One computer concentrates the maintenance data of the other computers.
Example: Flight Management and Guidance Computers (FMGC) and Flight Augmentation Computer (FAC) with FMGC 1 as A, FMGC 2 as B and FAC 1 as C.

DUPLICATED SYSTEM

A duplicated system includes two different subsystems in the same computer.
Example: Air Data Inertial Reference Unit (ADIRU) with ADR as subsystem 1 and IR as subsystem 2.

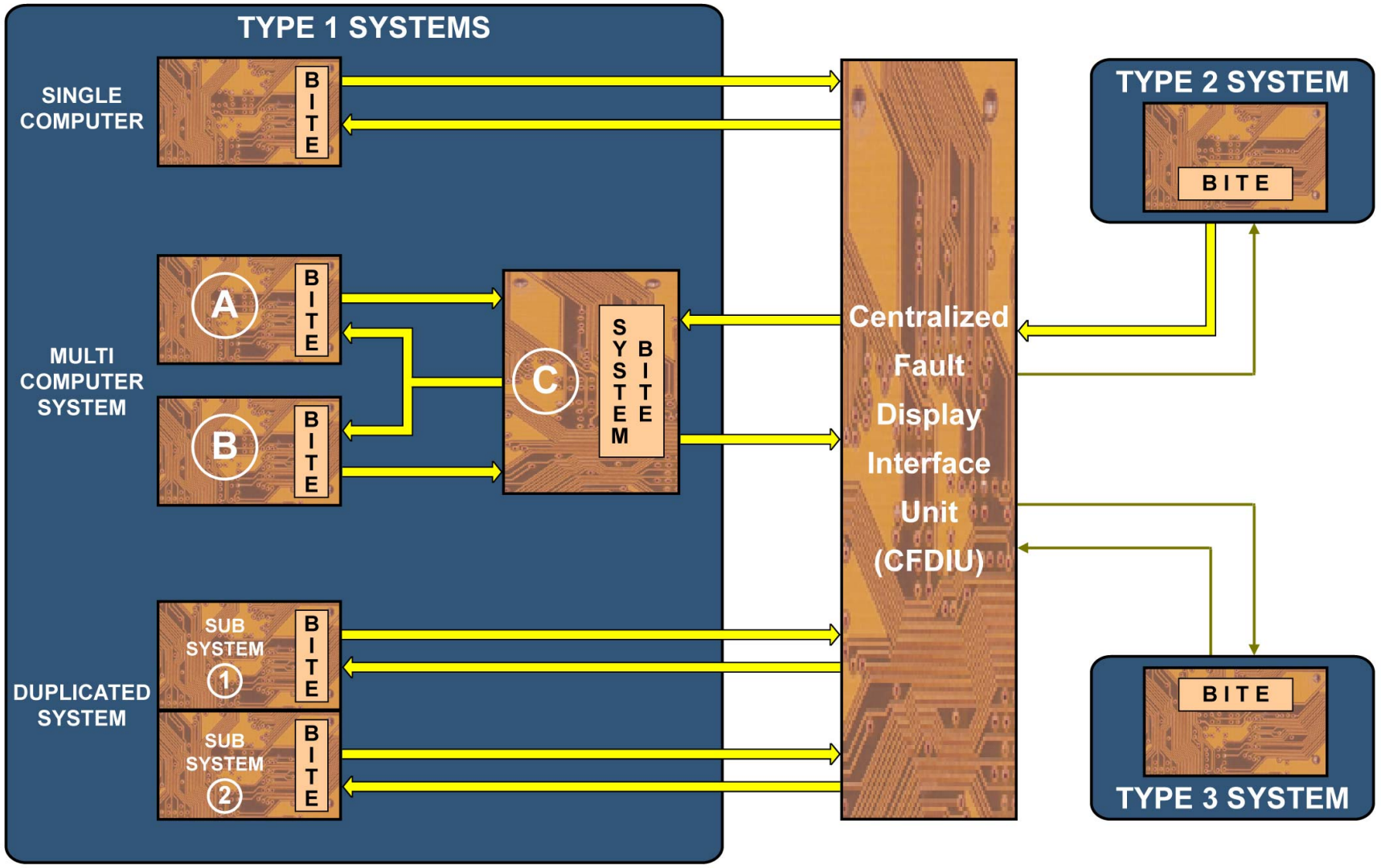
TYPE 2 SYSTEM

Type 2 systems memorize only failures from the last flight leg. The discrete signal is provided to initiate the test of the system.
Example: Avionic Electronic Ventilation Computer (AEVC).

TYPE 3 SYSTEM

Type 3 systems are simple systems linked to the CFDS by only two discrete signals. Type 3 systems cannot memorize failure messages. The discrete input permits to initiate the test or reset. The discrete output indicates if the system is OK or not.
Example: Transformer Rectifier Unit (TRU)

UGB13131 - U7ST0M0 - UM31P7000000001



TYPE 1 SYSTEMS ... TYPE 3 SYSTEM

CFDS FAILURE CLASSIFICATION (2)

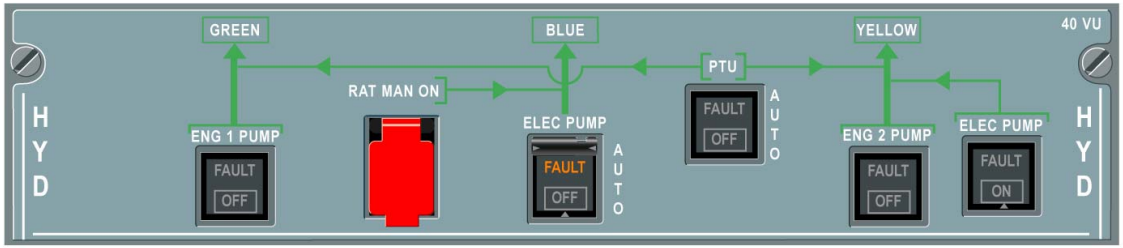
CLASS 1

Class 1 failures have an operational consequence on the flight. You can display the class 1 failures on the MCDU:
- in the LAST (or CURRENT) LEG REPORT.
- in the LAST (or CURRENT) LEG ECAM REPORT.

These faults are also indicated to the crew in flight:
- by the ECAM system (upper and/or lower Display Unit (DU)).
- by local warning in the cockpit.

Refer to the Minimum Equipment List (MEL):
"GO", "GO IF" or "NO GO".

UGB13131 - U7ST0M0 - UM31P800000001

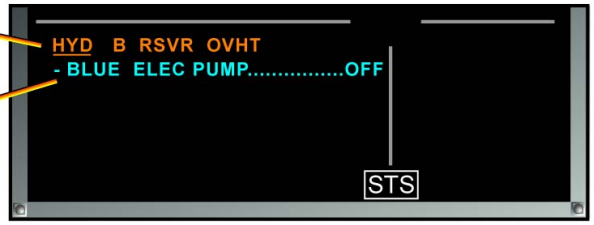


LOCAL WARNING ON SYSTEM CONTROL PANEL (HYDRAULIC)

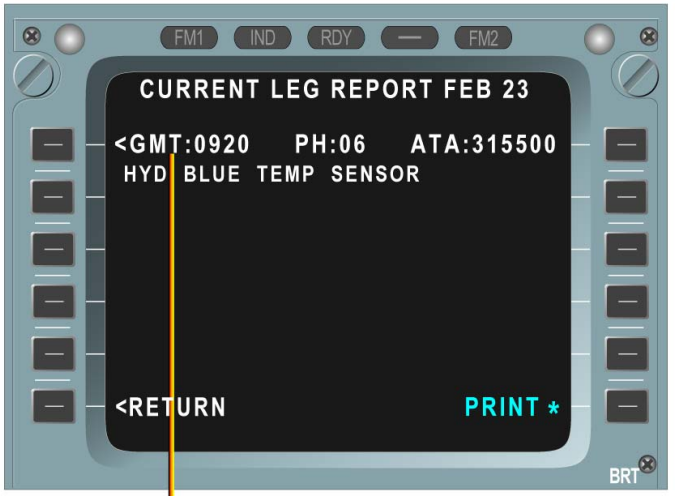
CLASS 1

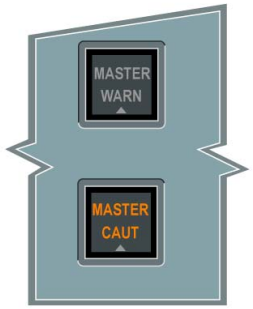
NATURE OF THE FAILURE

ACTION TO BE PERFORMED

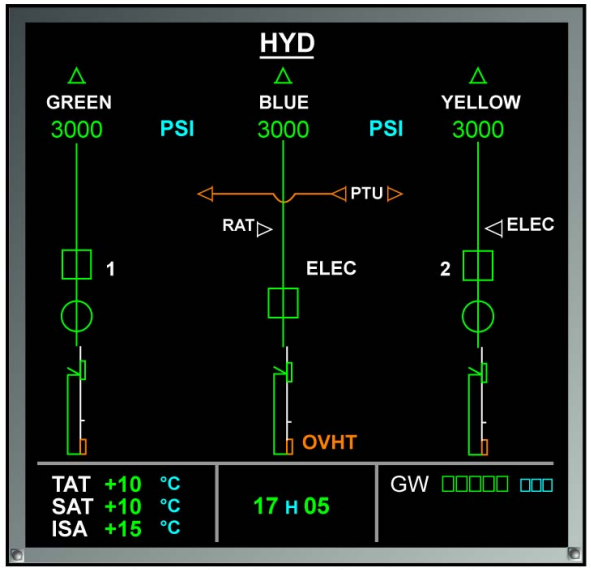


MCDU





(131 VU)



AUTOMATIC DISPLAY OF THE AIRCRAFT SYSTEM PAGE RELATED TO THE FAILURE

TIME OF CFDS FAULT RECEPTION

CLASS 1

CFDS FAILURE CLASSIFICATION (2)

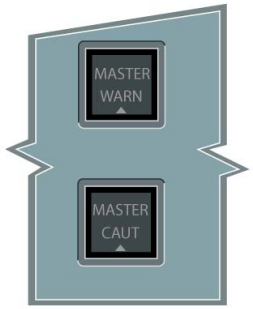
CLASS 2

Class 2 failures have no immediate operational consequence and can be displayed on request on the ECAM STATUS page, under the MAINTENANCE title. You can display the class 2 failures on the MCDU:
- in the LAST (or CURRENT) LEG REPORT.
- in the LAST (or CURRENT) LEG ECAM REPORT.

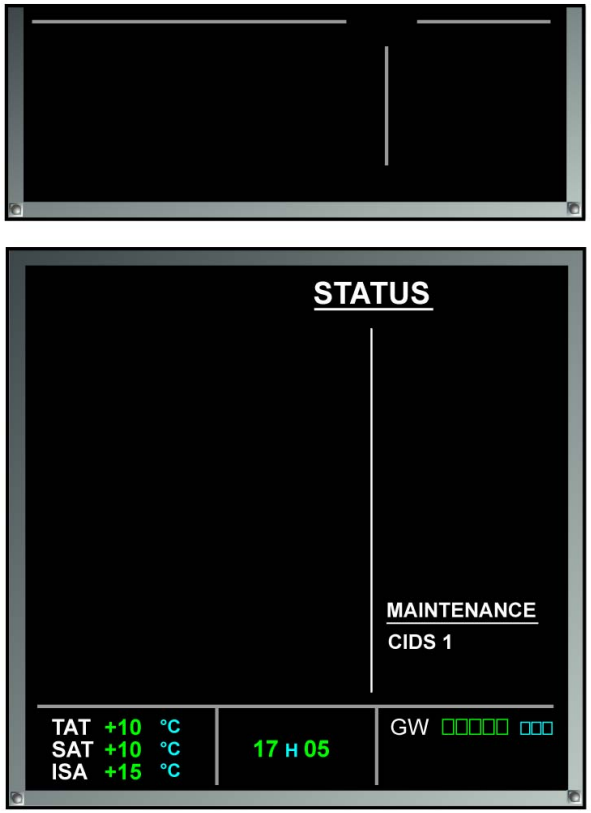
A class 2 failure has to be repaired within 10 days. Refer to the MEL: "GO" without condition. The example given here concerns the Cabin Intercommunication Data System (CIDS) fault.

UGB13131 - U7ST0M0 - UM31P800000001

CLASS 2

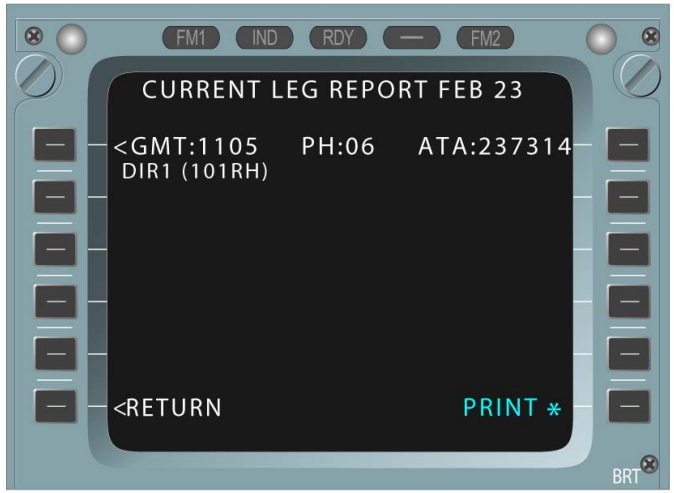


(131 VU)



MANUAL SELECTION OF THE "ECAM STATUS" PAGE

MCDU



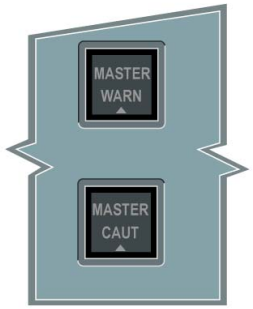
CLASS 2

CFDS FAILURE CLASSIFICATION (2)

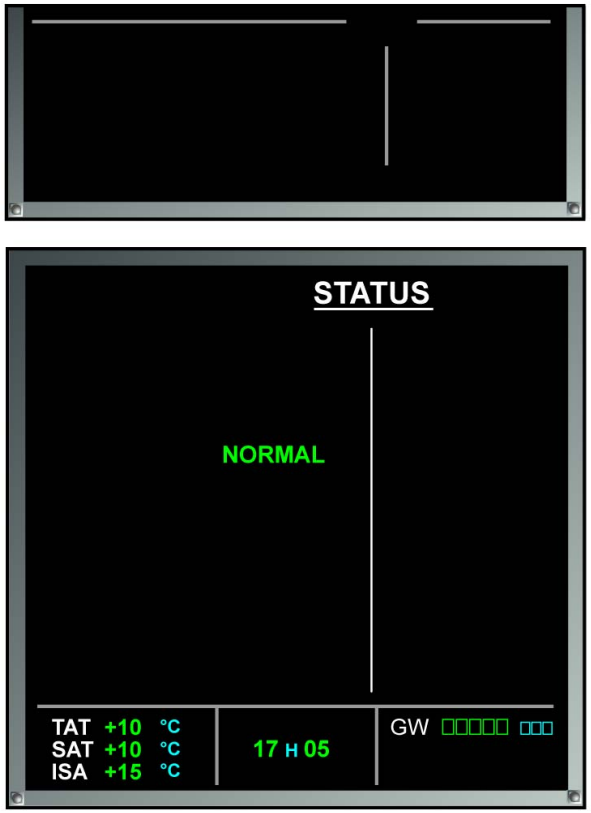
CLASS 3

Class 3 failures have no operational consequence. All aircraft systems remain available. These faults are not indicated to the crew but you can display the name of the systems affected by at least a class 3 failure in the AVIONICS STATUS (only available on ground). Do not refer to the MEL. Class 3 failures have no fixed time for correction. However, correction is recommended to improve the dispatch reliability. Class 3 failures may be corrected during the A CHECK programmed maintenance operations.

UGB13131 - U7ST0M0 - UM31P800000001

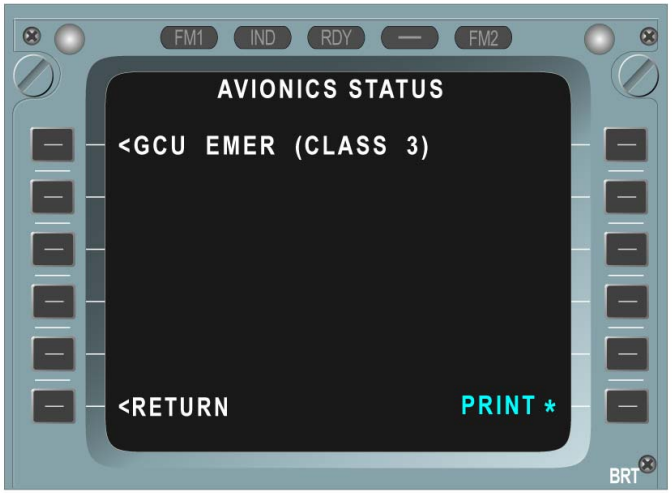


(131 VU)



CLASS 3

MCDU



CLASS 3

CFDS FAILURE CLASSIFICATION (2)

SYNTHESIS

Class 1 and 2 failures are displayed in the LAST (or CURRENT) LEG REPORT and in the LAST (or CURRENT) LEG ECAM REPORT.
AVIONICS STATUS displays, on ground, the title of the systems currently affected by any failure class.

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	CLASS 1 FAILURE	CLASS 2 FAILURE	CLASS 3 FAILURE
Operational consequence on the current flight	YES	NO	NO
Indicated to the pilots	YES Warnings/flags System pages	YES On the STATUS page	NO
Dispatch consequences	REFER TO MEL May be: "GO","GO IF" or "NO GO"	FUNCTIONS LOST INDICATED IN MEL "GO" without condition	NO REFERENCE IN MEL
Maintenance information	Have to be reported by the pilots in the log book. Are indicated at the end of each flight leg. MEL entry is required.		Available on request. No fixed time for correction.

SYNTHESIS

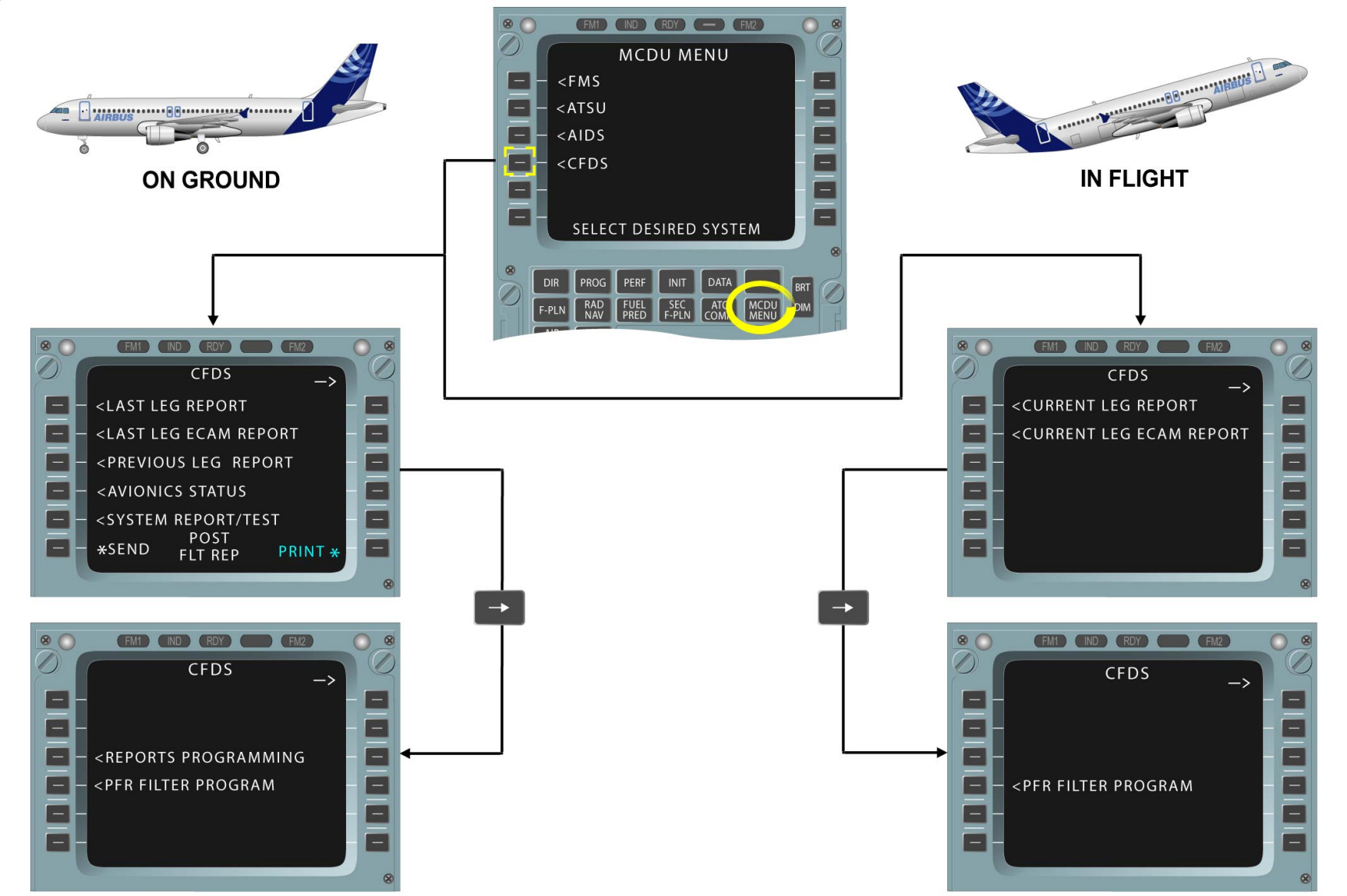
CFDS REPORTS (2)

GENERAL

On ground, all the functions are available. In flight, only CURRENT LEG REPORT and CURRENT LEG ECAM REPORT are available.

NOTE: Note: The Centralized Fault Display System (CFDS) menu comprises two pages.

UGB13131 - U7ST0M0 - UM31P900000001


ON GROUND
IN FLIGHT
MCDU MENU
<FMS
<ATSU
<AIDS
<CFDS
SELECT DESIRED SYSTEM
DIR
PROG
PERF
INIT
DATA
F-PLN
RAD NAV
FUEL PRED
SEC F-PLN
MCDU MENU
BRT
DIM
CFDS
<LAST LEG REPORT
<LAST LEG ECAM REPORT
<PREVIOUS LEG REPORT
<AVIONICS STATUS
<SYSTEM REPORT/TEST
*SEND
POST FLT REP
PRINT *
CFDS
<REPORTS PROGRAMMING
<PFR FILTER PROGRAM
CFDS
<CURRENT LEG REPORT
<CURRENT LEG ECAM REPORT
CFDS
<PFR FILTER PROGRAM

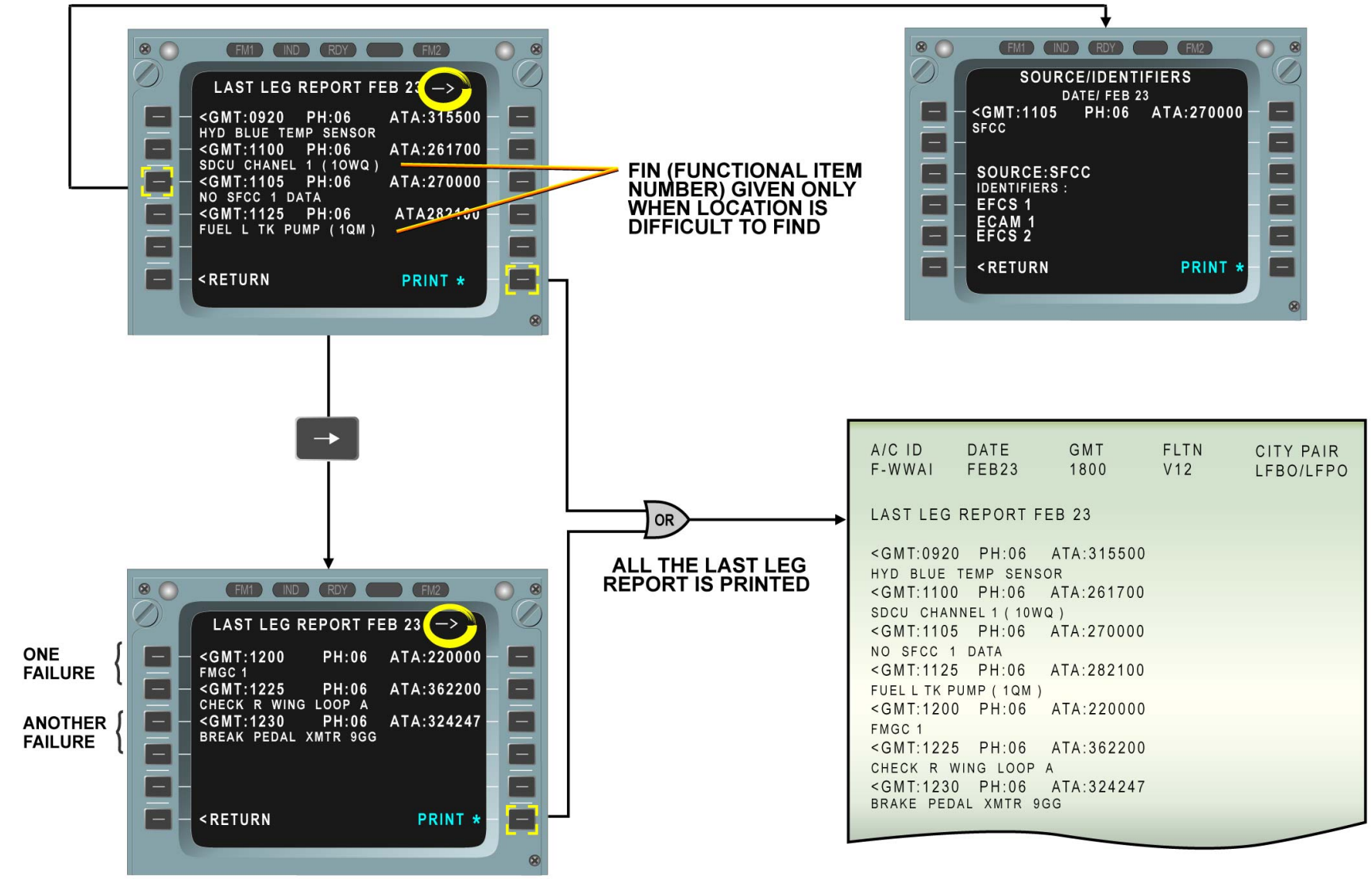
GENERAL

CFDS REPORTS (2)

LAST/CURRENT LEG REPORT

The LAST LEG REPORT shows failure information delivered by the Built-in Test Equipments (BITEs) of the aircraft systems. It can store up to 40 failures occurred during the last leg. Pressing the Slat Flap Control Computer (SFCC) channel 1 (3L) line key allows access to the related IDENTIFIERS page. The LAST LEG REPORT shows the internal failures (class one and two) only. The SOURCE/IDENTIFIERS page shows the list of systems affected by the source failure, which is an external failure for them. On the ground, the title of this item is LAST LEG REPORT. In flight, it is CURRENT LEG REPORT. When the report is shown on several pages, an arrow appears on the top right-hand corner. The key helps you to see the following pages. If you select the key on the last page, you come back to the first page. When you select the PRINT line key, all the LAST LEG REPORT is printed, even if it contains several pages.

UGB13131 - U7ST0M0 - UM31P900000001



LAST/CURRENT LEG REPORT

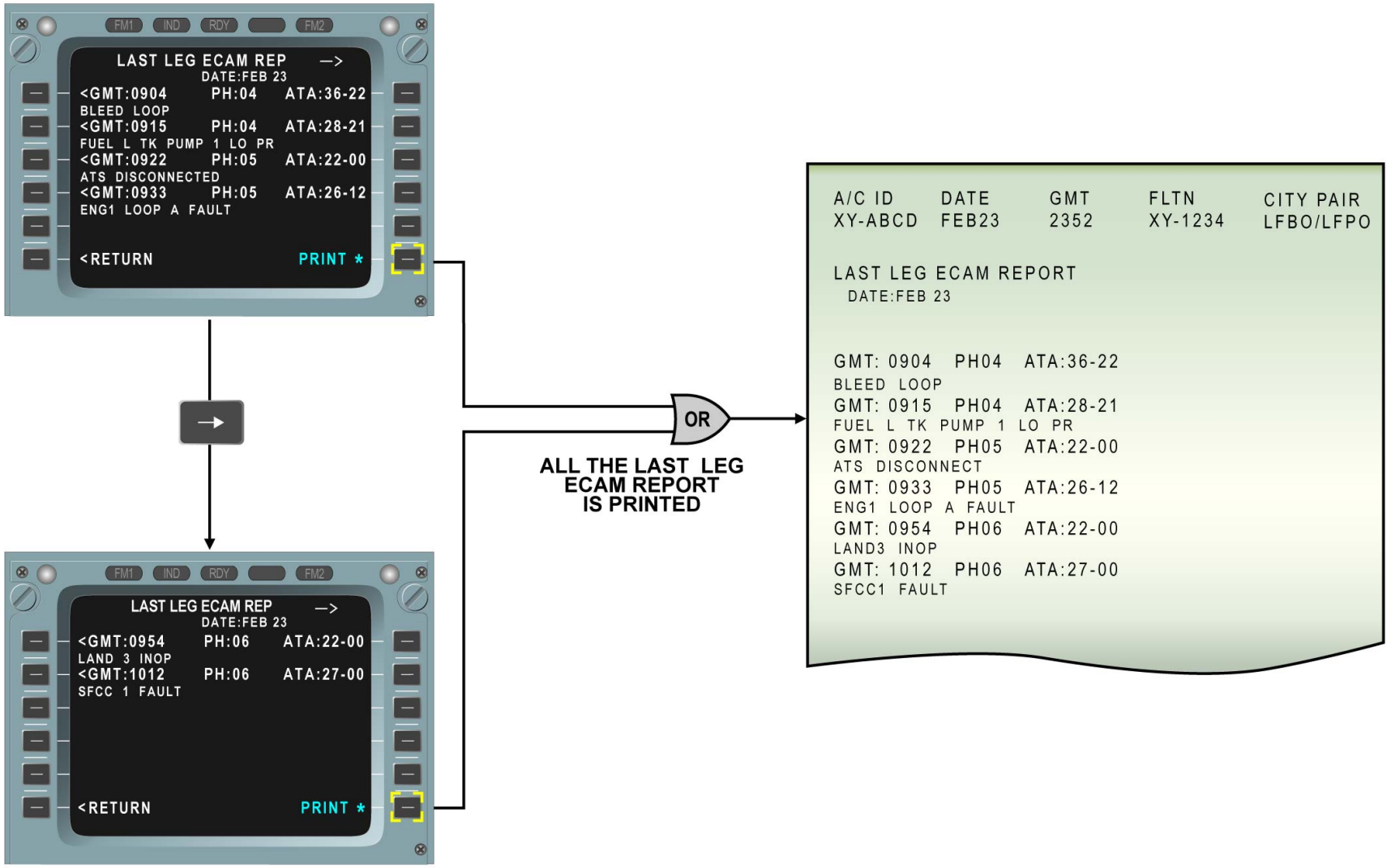
CFDS REPORTS (2)

LAST/CURRENT LEG ECAM REPORT

The LAST LEG ECAM REPORT shows the list of Electronic Centralized Aircraft Monitoring (ECAM) warning messages sent to the Centralized Fault Display Interface Unit (CFDIU) by the Flight Warning Computers (FWC). It can store up to 40 warnings occurred during the last leg. On ground, the title of this item is LAST LEG ECAM REPORT; in flight it is CURRENT LEG ECAM REPORT. Documentary data appears on the print report:
- the A/C identification,
- date and Greenwich Mean Time (GMT),
- the flight number,
- the city pair.

When you select the PRINT line key, all the LAST LEG ECAM REPORT is printed.

UGB13131 - U7ST0M0 - UM31P900000001



LAST/CURRENT LEG ECAM REPORT

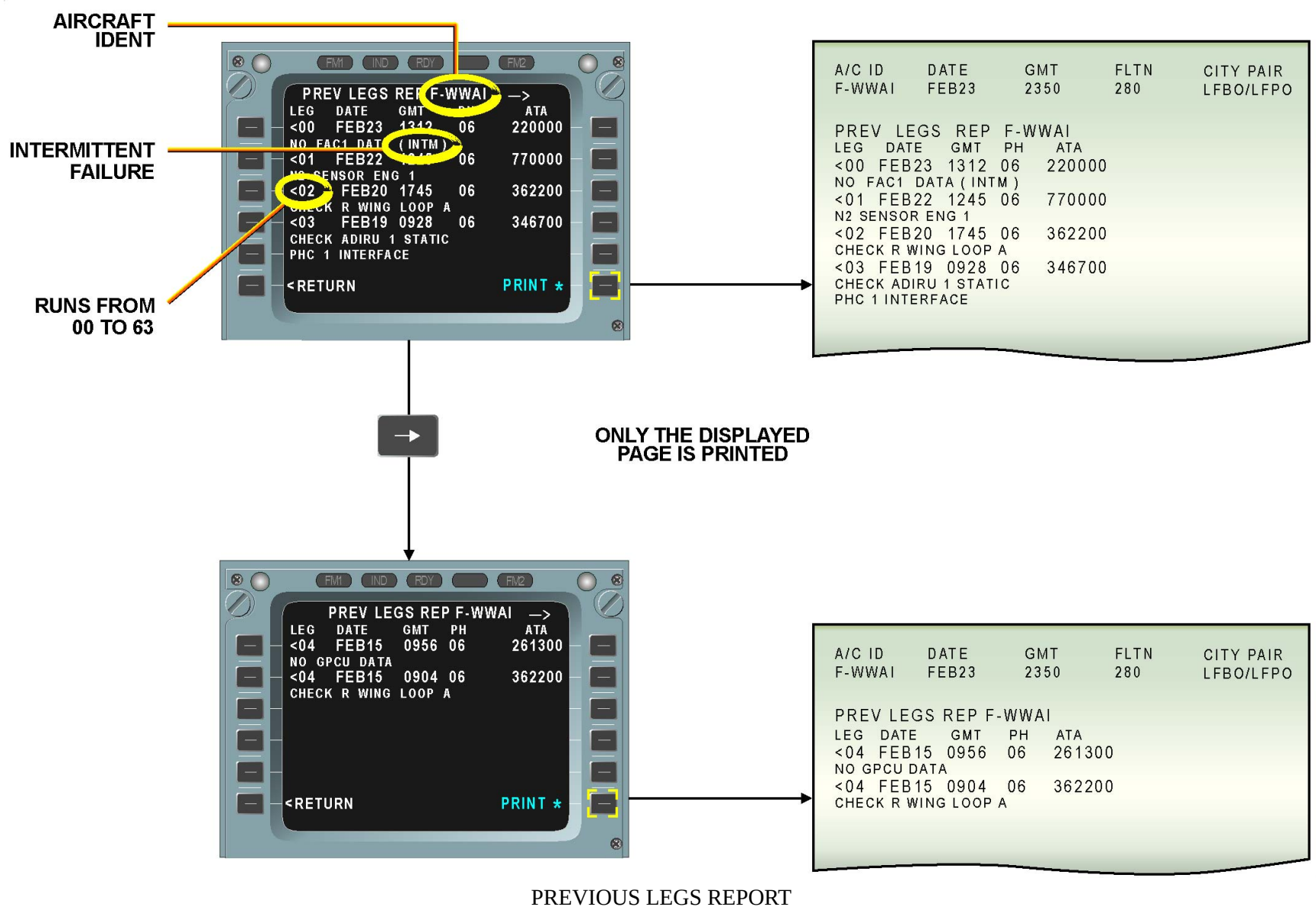
CFDS REPORTS (2)

PREVIOUS LEGS REPORT

At each new flight leg, the content of the LAST LEG REPORT is transferred into the PREVIOUS LEGS REPORT. This report can store up to 200 failures over the last 64 flight legs. The PREVIOUS LEGS REPORT is displayed only on ground. Each failure message contains the same kind of data as the LAST LEG REPORT. For example:
FEB 22 1312
22-00-00
NO FAC 1 DATA (INTM)
It also contains a flight leg counter relative to the previous flight. XX is the number of flight legs before the last flight leg. For example:
01 (previous leg).

NOTE: As the leg number changes at ground/flight transition, the content of the LAST LEG REPORT is stored and identified in the PREVIOUS LEGS REPORT under the LEG -01. At flight/ground transition, the LAST LEG REPORT in the PREVIOUS LEGS REPORT is identified as 00.

"INTM" means that the failure has occurred intermittently. When you make a print of the PREVIOUS LEGS REPORT, only the displayed page is printed.



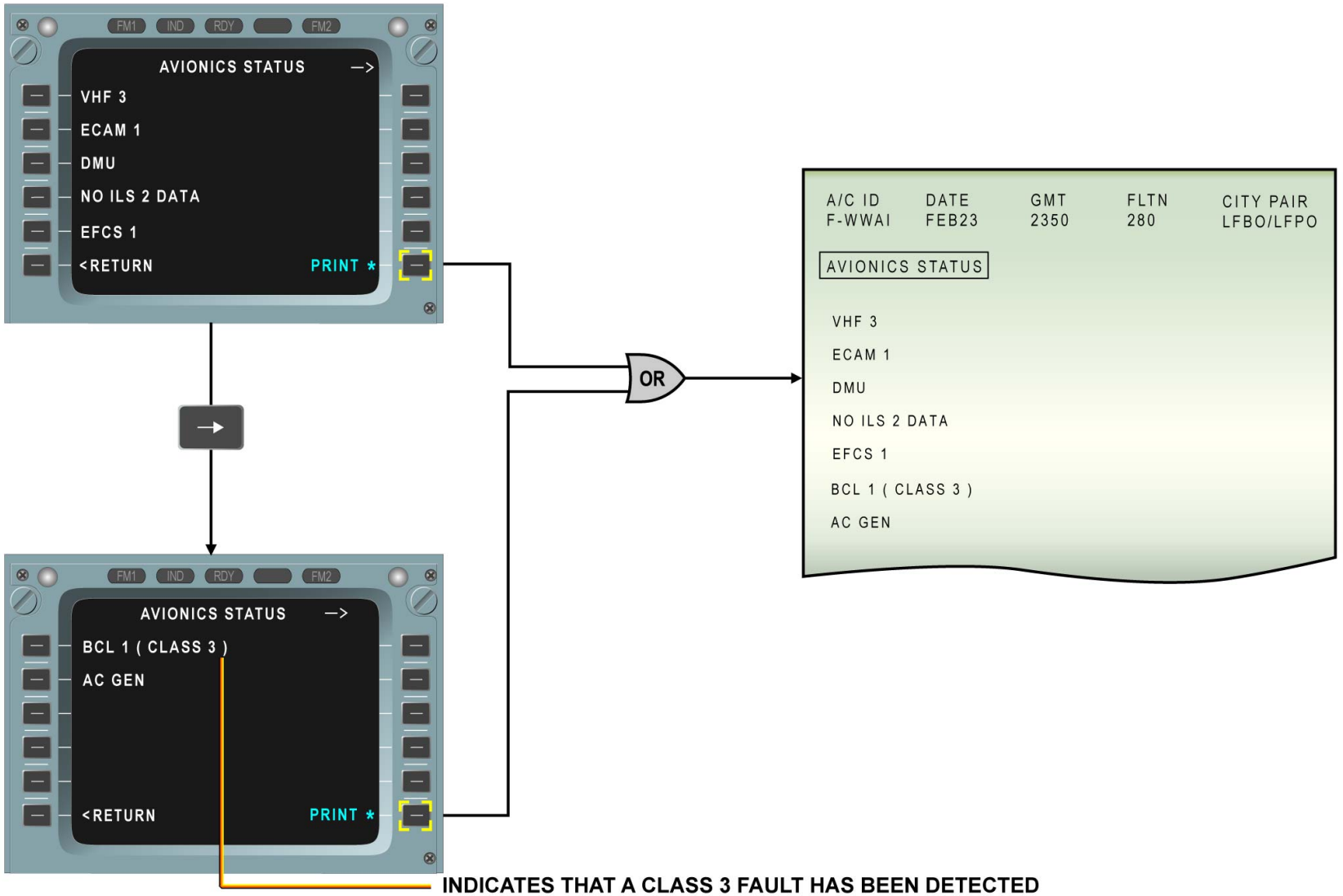
PREVIOUS LEGS REPORT

CFDS REPORTS (2)

AVIONICS STATUS

The AVIONICS STATUS presents the list of systems, which are currently affected by a failure. This function is only available on ground. The information presented is permanently updated. The message contains the name of the system presently affected by a failure, i.e. VHF3, or a NO X DATA message when the related system bus is not active. For example: NO ILS 2 DATA
The AVIONICS STATUS also indicates the class 3 failures. (CLASS 3) means that the system is affected by at least one class 3 failure. Note that there could also be class 1 or 2 failures. When you make a print, all the AVIONICS STATUS report is printed even if it contains several pages.

UGB13131 - U7ST0M0 - UM31P900000001



AVIONICS STATUS

CFDS REPORTS (2)

SYSTEM REPORT/TEST

The SYSTEM REPORT/TEST function is available on the ground only. It enables a dialogue between the CFDS and one system computer. The SYSTEM REPORT/TEST menu page presents the list of all the systems connected to the CFDIU, in ATA chapter order. An example of each system type is available:
- in Landing Gear (L/G) for type 1 systems,
- in Air Conditioning (AIRCOND) for type 2 systems,
- in Electrical (ELEC) for type 3 systems.

SYSTEM REPORT/TEST-BSCU A (Type 1 system)

Type 1 systems are the most common systems. The menu they present depends on the system itself. In the MENU mode, the menu is transmitted by the system itself. You talk directly with the system. The menu includes three basic functions:
- the LAST LEG REPORT,
- the PREVIOUS LEGS REPORT,
- the LRU IDENTIFICATION,

and optional functions, depending on the system for example:
- TROUBLE SHOOTING DATA,
- CLASS 3 FAULTS,
- TEST,
- GROUND SCANNING.

LAST LEG REPORT

This function presents the internal and external failure messages concerning this system that appeared during the last flight. These failure messages contain the name of the failed Line Replaceable Unit (LRU) associated with the time at which the failure occurred and the ATA reference.

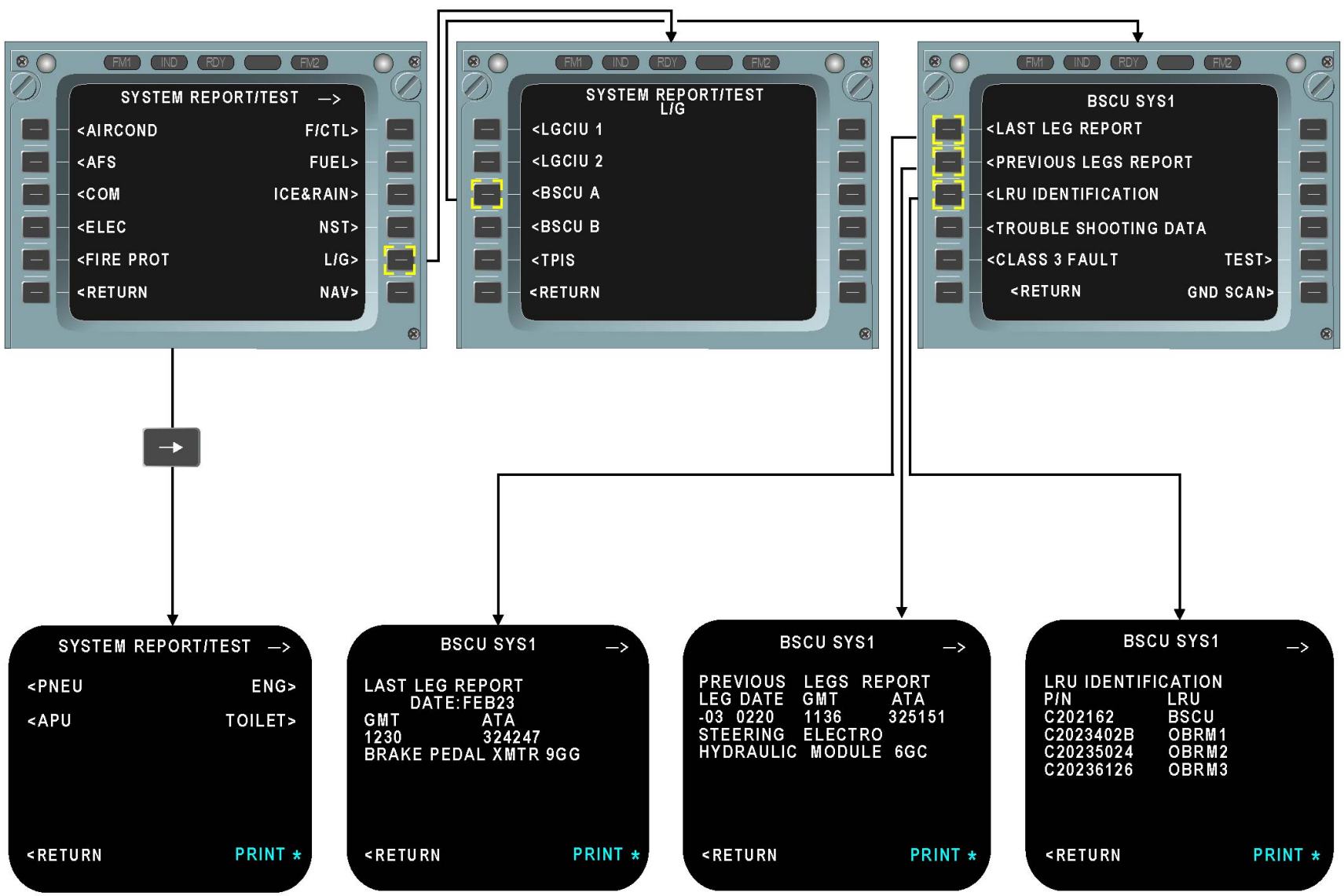
PREVIOUS LEGS REPORT

This function presents the internal and external failure messages concerning this system that appeared during the previous 64 flights. The failure messages contain the name of the failed LRU associated with the time and date at which the failure occurred, the flight number (-00 to -63) and the ATA reference.

LRU IDENTIFICATION

This function presents the Part Number (PN) of the LRUs.

UGB13131 - U7ST0M0 - UM31P900000001



SYSTEM REPORT/TEST & SYSTEM REPORT/TEST-BSCU A (TYPE 1 SYSTEM)

CFDS REPORTS (2)

SYSTEM REPORT/TEST-BSCU A (Type 1 system) (continued)

TROUBLE SHOOTING DATA

This item presents complementary information concerning the failures for trouble shooting at level 3 (engineering maintenance). These messages contain data constituting a snapshot of the system environment at the moment of the failure or contain parameters internal to the computer (Aircraft configuration, valve positions,...). This information is presented on MCDU in hexadecimal language. When required, the Trouble Shooting Manual (TSM) gives the interpretation of the message.

CLASS 3 faults

This item presents class 3 failure messages concerning this system that appeared during previous flights. These failure messages contain the name of the equipment affected by a class 3 fault associated with the time, the date, the flight number and the ATA reference.

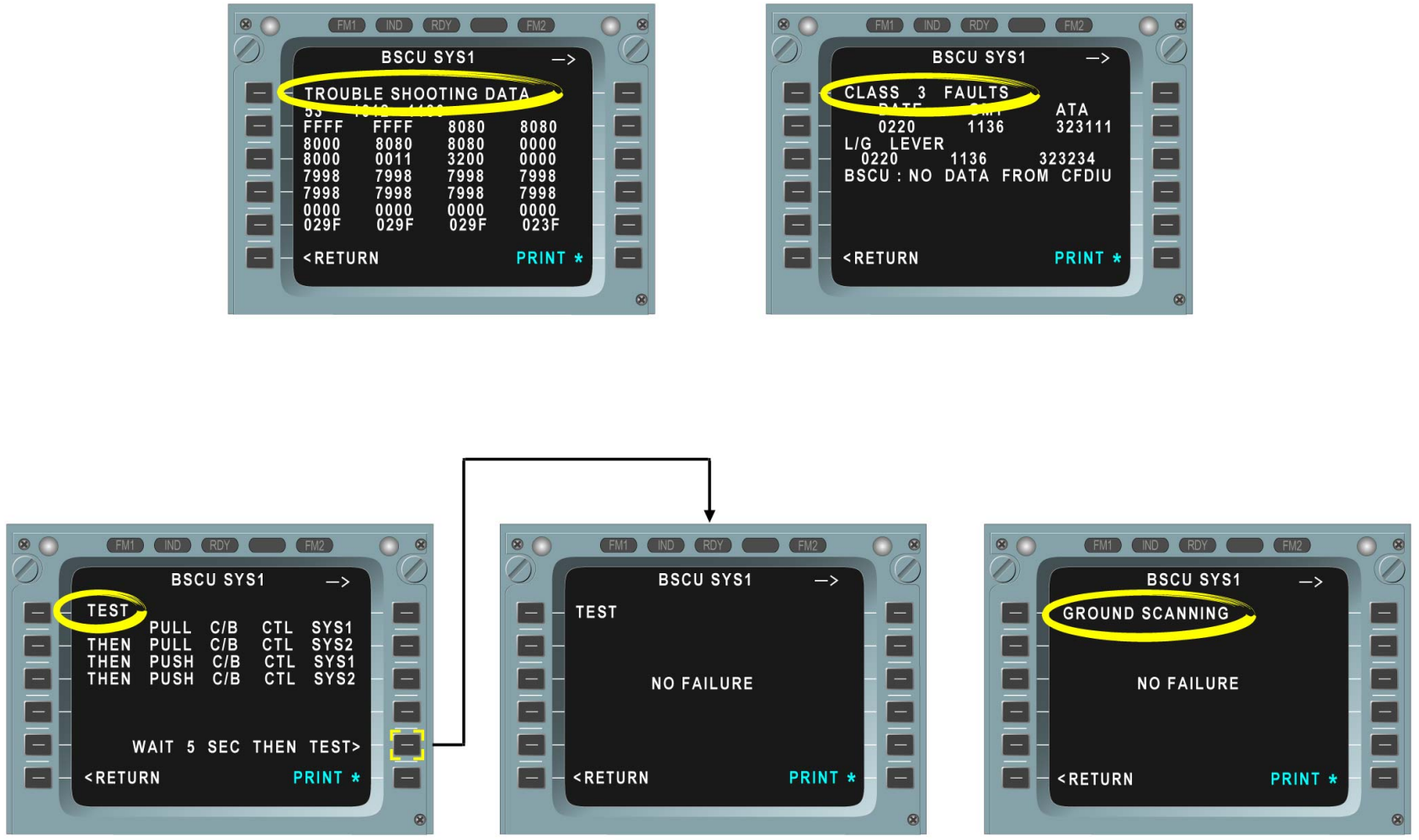
TEST

This item initiates system tests and shows the test results on the MCDU. The CFDIU transmits the code of the line key (TEST) to the system. The system BITE executes its test and may display a wait message to the CFDIU when the test lasts for a long time. At the end of the test, the BITE transmits the test results to the CFDIU for display.

GROUND SCANNING

This item presents the internal and external failures concerning this system and which are present when the request is made (on ground only). This report is established by forcing the operation of the BITE in system normal mode (same BITE operation as in flight).

UGB13131 - U7ST0M0 - UM31P900000001



SYSTEM REPORT/TEST-BSCU A (TYPE 1 SYSTEM) - TROUBLE SHOOTING DATA ... GROUND SCANNING

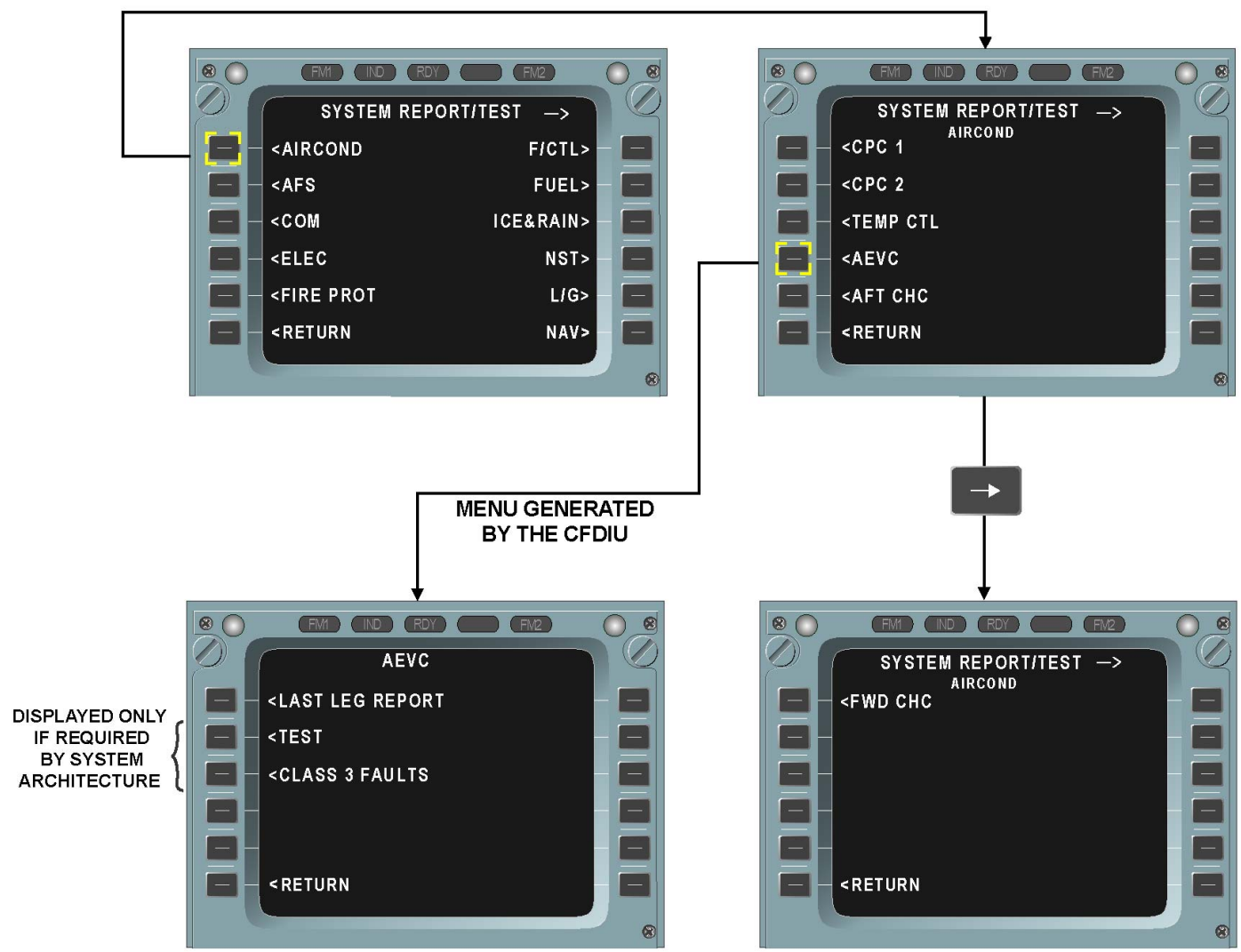
CFDS REPORTS (2)

SYSTEM REPORT/TEST-AEVC (Type 2 system)

Type 2 systems present a menu with one basic function, the LAST LEG REPORT and optional functions depending on the system. Unlike Type 1 systems, Type 2 systems do not have a Menu Mode. These functions are presented on the MCDU by the CFDIU: you are in PSEUDO-MENU mode. You do not talk directly to the system. The system permanently transmits its data on the system bus, and the CFDIU reads them, except for the test. The menu includes one basic function:
- the LAST LEG REPORT,

and optional functions depending on the system, for example here
- TEST,
- CLASS 3 FAULTS.

UGB13131 - U7ST0M0 - UM31P900000001



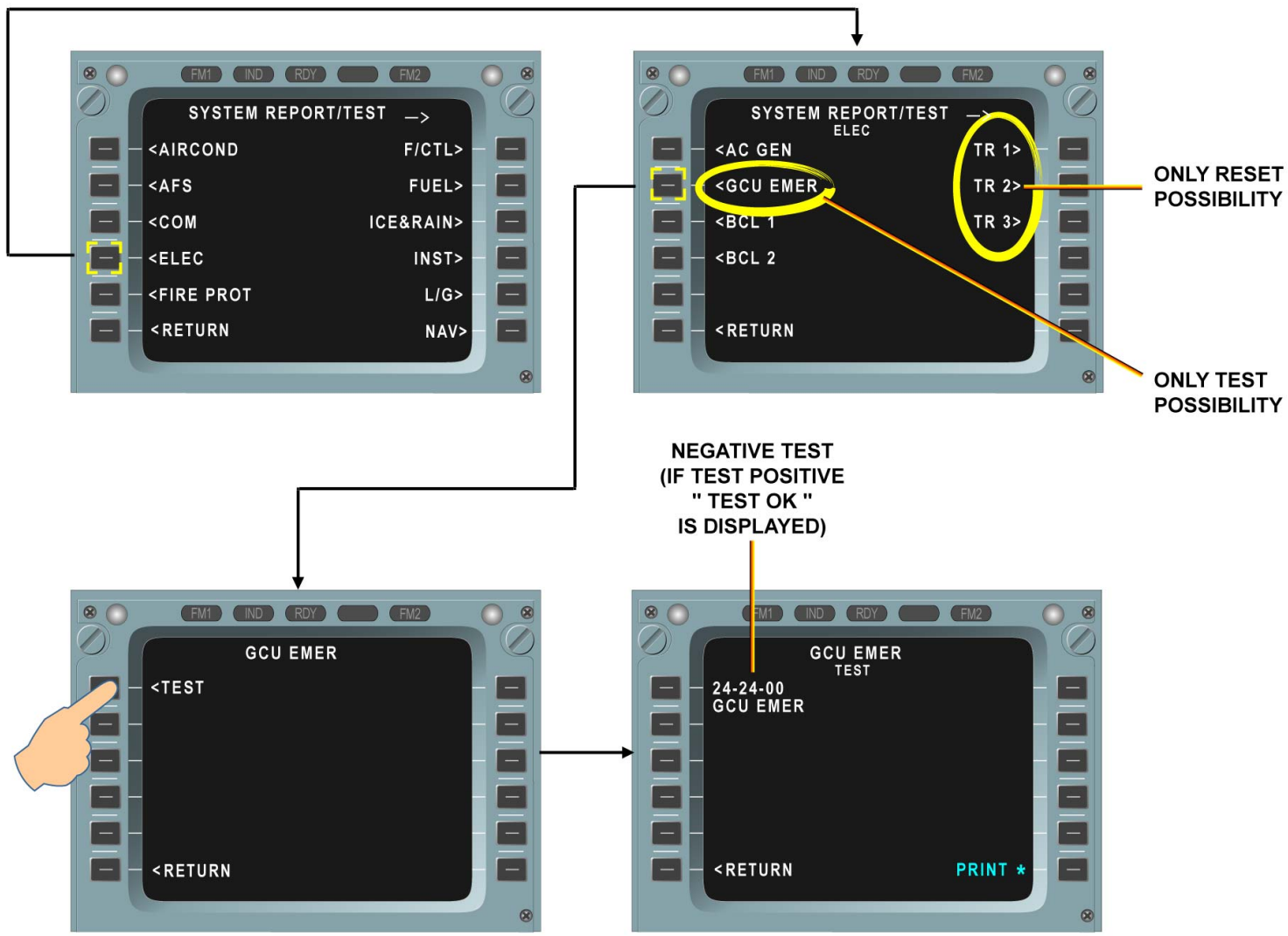
SYSTEM REPORT/TEST-AEVC (TYPE 2 SYSTEM)

CFDS REPORTS (2)

SYSTEM REPORT/TEST-GCU EMER (Type 3 system)

Type 3 systems present only one function on their menu. Type 3 systems have no MENU mode. The available functions are shown by the CFDIU. The only possible functions are TEST or RESET. When you make a test or a reset, the CFDIU initiates the test or the reset, receives the result and shows it on the MCDU.

UGB13131 - U7ST0M0 - UM31P900000001



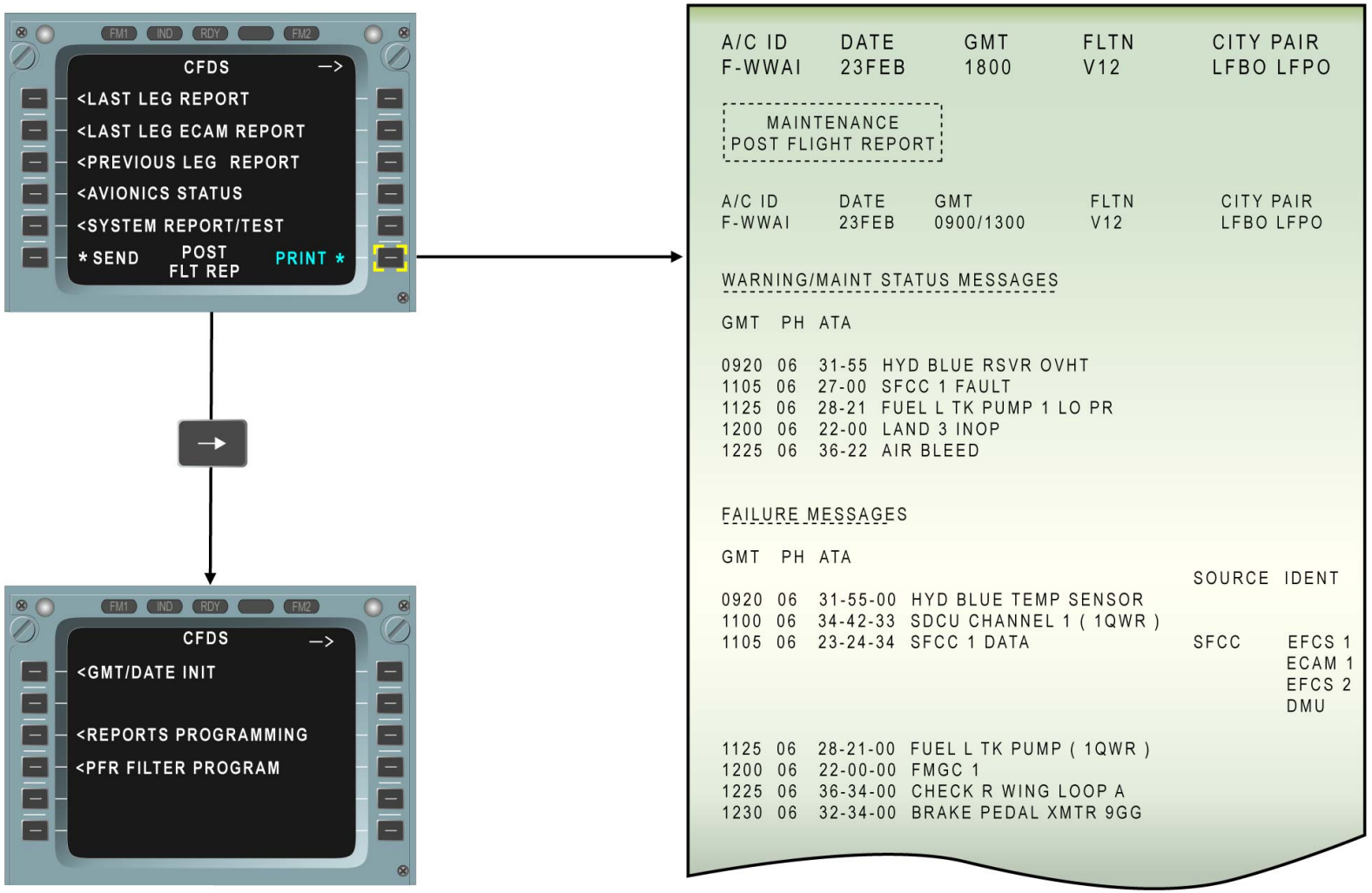
SYSTEM REPORT/TEST-GCU EMER (TYPE 3 SYSTEM)

CFDS REPORTS (2)

POST FLIGHT REPORT

The POST FLIGHT REPORT (PFR) is the sum of the LAST LEG REPORT and of the LAST LEG ECAM REPORT. It is only available on the printer. ECAM WARNING MESSAGES show/give the LAST LEG ECAM REPORT. FAULT MESSAGES show/give the LAST LEG REPORT.

UGB13131 - U7ST0M0 - UM31P900000001


FM1 IND RDY FM2
CFDS –>
<LAST LEG REPORT
<LAST LEG ECAM REPORT
<PREVIOUS LEG REPORT
<AVIONICS STATUS
<SYSTEM REPORT/TEST
* SEND
POST FLT REP
PRINT *
FM1 IND RDY FM2
CFDS –>
<GMT/DATE INIT
<REPORTS PROGRAMMING
<PFR FILTER PROGRAM
A/C ID DATE GMT FLTN CITY PAIR
F-WWAI 23FEB 1800 V12 LFBO LFPO
MAINTENANCE
POST FLIGHT REPORT
A/C ID DATE GMT FLTN CITY PAIR
F-WWAI 23FEB 0900/1300 V12 LFBO LFPO
WARNING/MAINT STATUS MESSAGES
GMT PH ATA
0920 06 31-55 HYD BLUE RSVR OVHT
1105 06 27-00 SFCC 1 FAULT
1125 06 28-21 FUEL L TK PUMP 1 LO PR
1200 06 22-00 LAND 3 INOP
1225 06 36-22 AIR BLEED
FAILURE MESSAGES
GMT PH ATA
SOURCE IDENT
0920 06 31-55-00 HYD BLUE TEMP SENSOR
1100 06 34-42-33 SDCU CHANNEL 1 (1QWR)
1105 06 23-24-34 SFCC 1 DATA
SFCC EFCS 1
ECAM 1
EFCS 2
DMU
1125 06 28-21-00 FUEL L TK PUMP (1QWR)
1200 06 22-00-00 FMGC 1
1225 06 36-34-00 CHECK R WING LOOP A
1230 06 32-34-00 BRAKE PEDAL XMTR 9GG

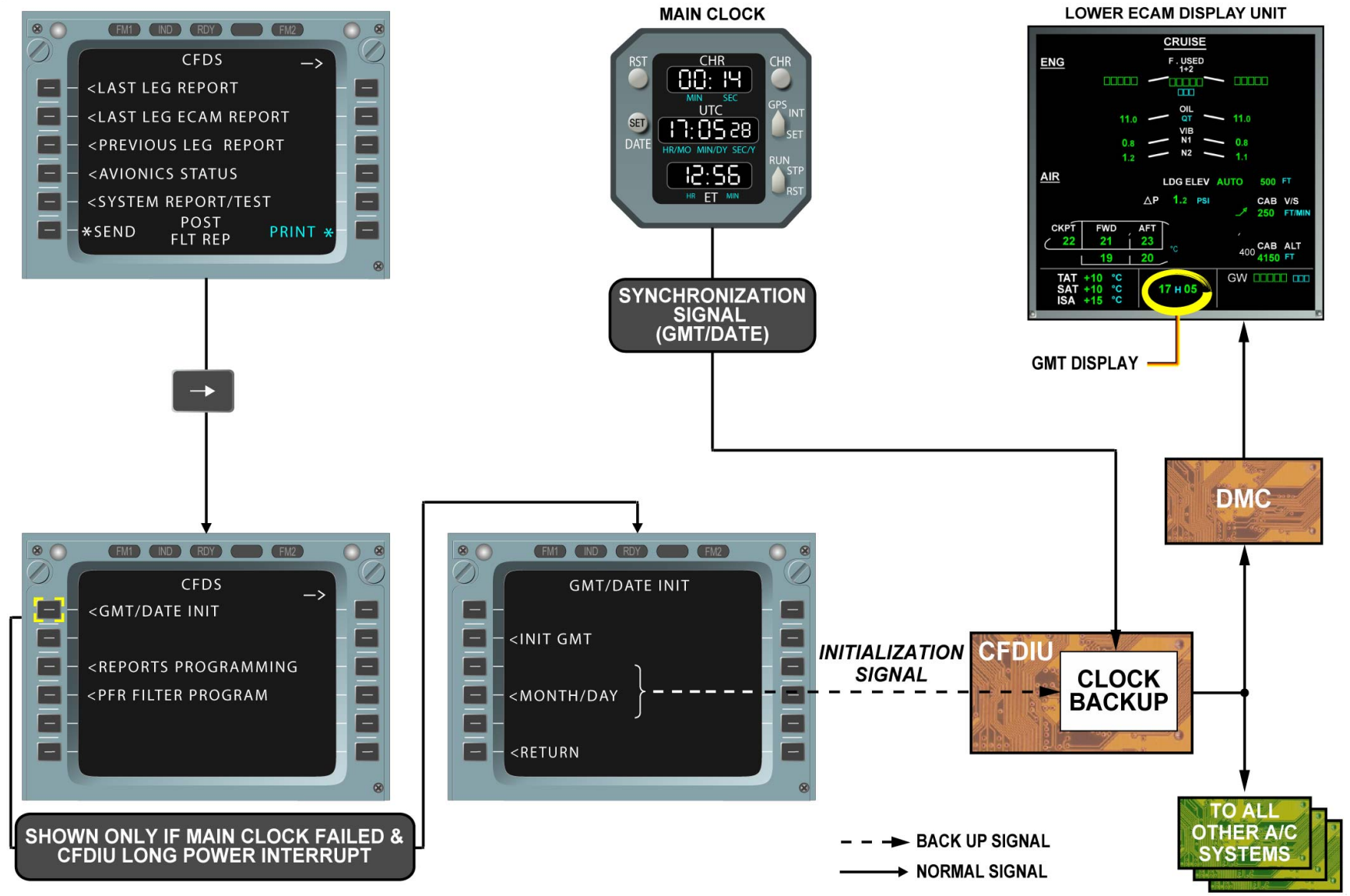
POST FLIGHT REPORT

CFDS REPORTS (2)

GMT/DATE INIT

The GMT/DATE INIT function is available only in case of clock failure and CFDIU power interrupt. In normal operation, the CFDIU receives the time from the clock. In the event of main clock failure, the CFDIU transmits the time and the date using its internal clock. The CFDIU shows the time on the ECAM Display Unit (DU). Re initialization of the time and the date will be only necessary after a power cut-off. It shall be carried out on MCDU through the GMT/DATE INIT function. GMT and date are entered by using the scratchpad.

UGB13131 - U7ST0M0 - UM31P900000001



GMT/DATE INIT

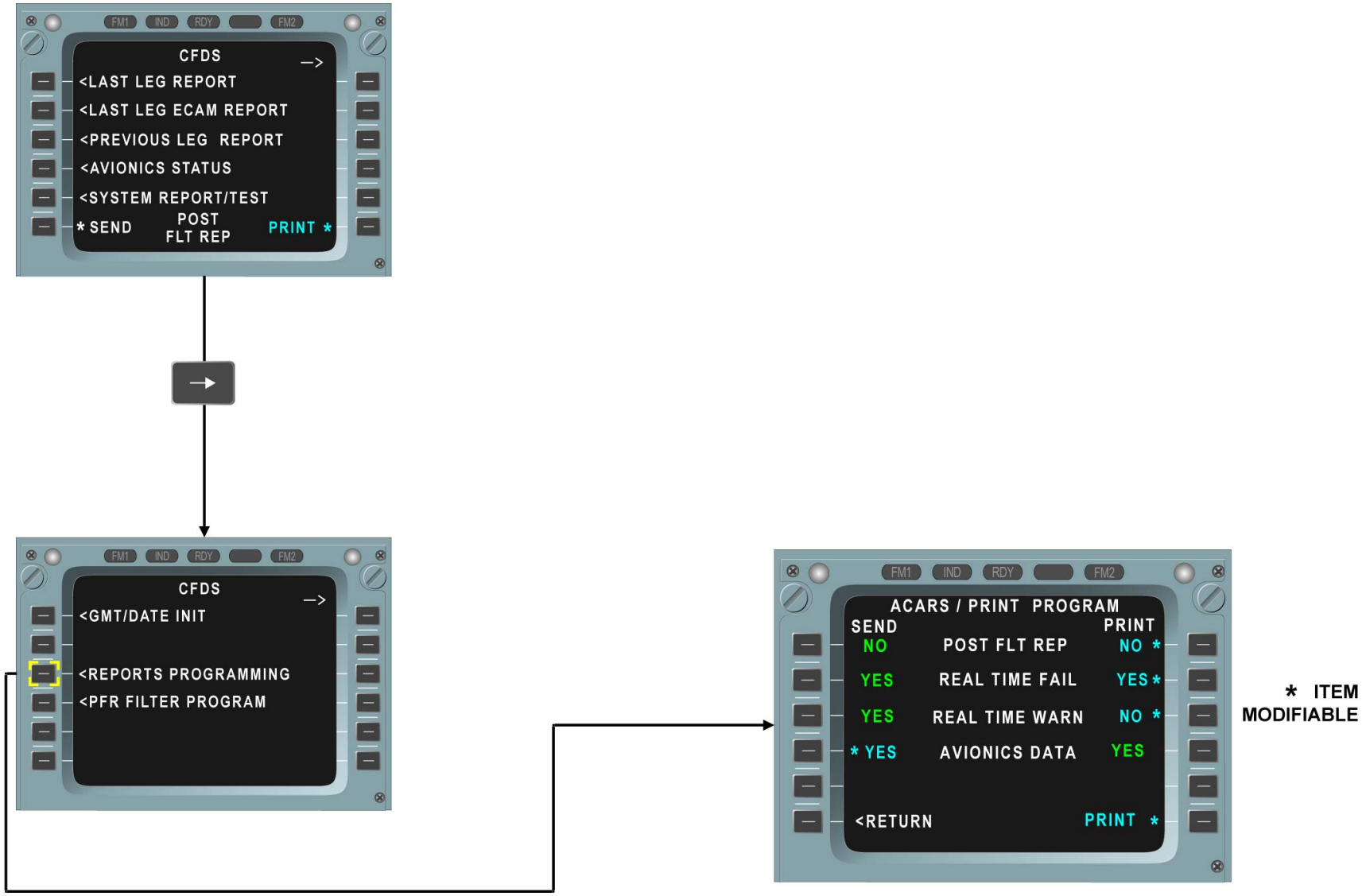
CFDS REPORTS (2)

REPORTS PROGRAMMING

This item sends the automatic transmission, via the Air Traffic Service Unit (ATSU), or printing of the following functions:
- PFR,
- real time failures,
- real time warnings and,
- avionics data.

If "YES" is selected for the send and print columns, the CFDIU will automatically transmit or print the PFR at the end of the flight or the failures and warnings in real time. For avionics data, "YES" in the send column, means that the system pages will be sent to the ground when the operator requests a print. A star beside "YES" or "NO" means that these items are modifiable. The programming of the send column is given by the ATSU and the programming of the print control for the avionics data is given by the system itself.

UGB13131 - U7ST0M0 - UM31P900000001



REPORTS PROGRAMMING

CFDS REPORTS (2)

PFR FILTER PROGRAM

The purpose of this function is to improve the operational use of the PFR, CURRENT/LAST LEG ECAM REPORT and LAST LEG REPORT, by filtering all the spurious or unjustified failures/messages. It concerns the PFR printed at the end of the flight as well as the real-time failure and warning information transmitted by the ATSU.

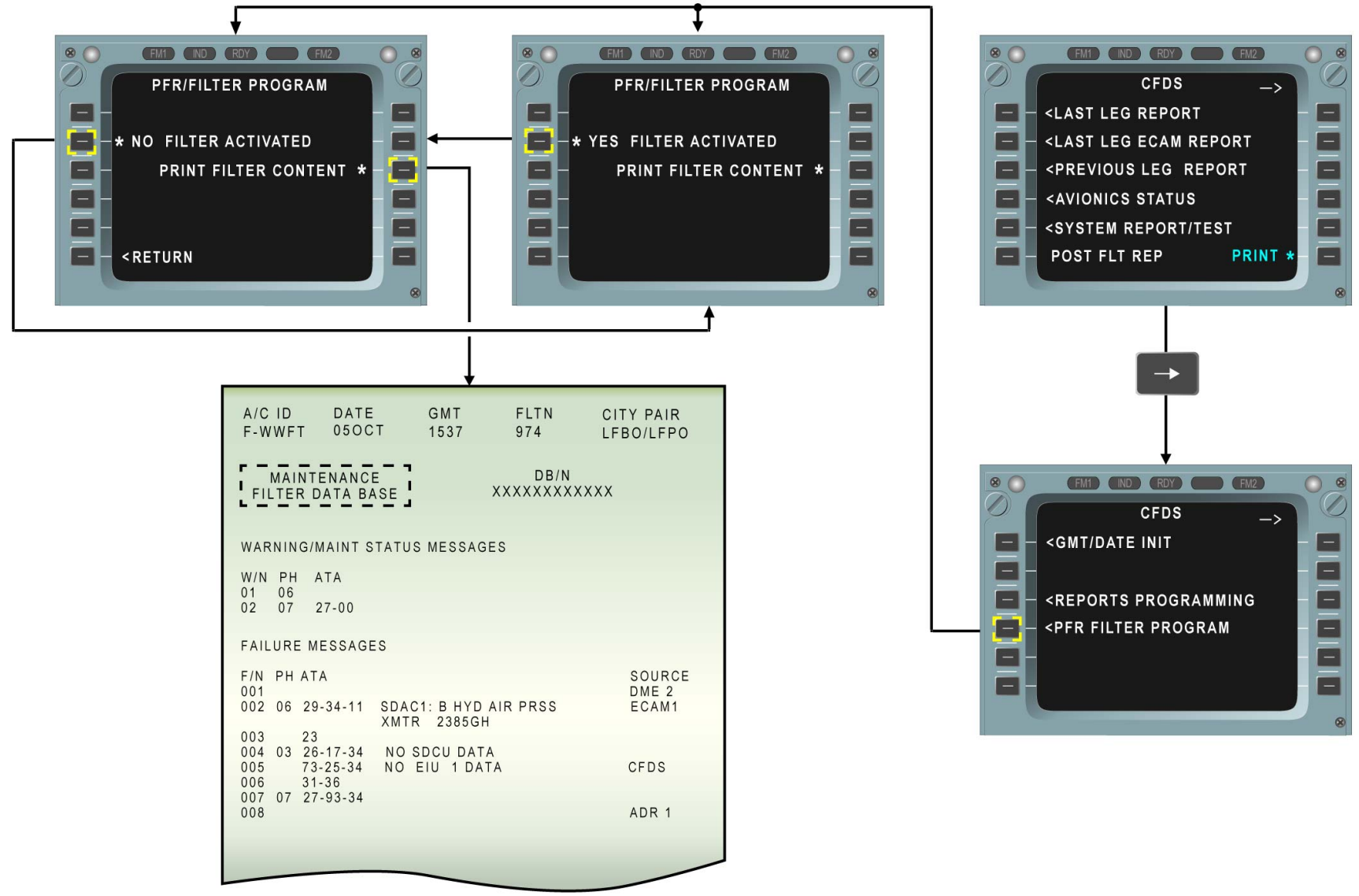
FILTER ACTIVATED

The filter database is activated after correct uploading. It can be deactivated then activated again through the second page of the main maintenance menu by pushing line key 4L then 2L. This database is adapted from Service Information Letter (SIL) 0028 under diskette form. It must be periodically updated.

PRINT FILTER CONTENT

Action on line key 3R starts the printing of the maintenance filter database.

UGB13131 - U7ST0M0 - UM31P900000001



PFR FILTER PROGRAM - FILTER ACTIVATED & PRINT FILTER CONTENT

CFDS PHASES (3)

GROUND/FLIGHT TRANSITION

Transition to flight (Event 1) is defined at the soonest or at the latest depending on whether the flight number has been entered by the crew before take-off or not:
- at the soonest: First engine start + 3 minutes if flight number entered prior to first engine start.
- at the latest: Aircraft speed > 80 knots if flight number not entered prior to first engine start.

At event "1", the leg number is incremented.

IN FLIGHT PHASE

From event 1 until aircraft speed has been below 80 knots for 150 seconds, type 1 and 3 systems are considered in flight.

NOTE: Type 2 systems are only considered in flight from 30 seconds after lift off up to touch down.

In flight, the system Built-In Test Equipment (BITE) ensures:
- detection (Type 1/2/3 systems) and memorization in their flight memory (Type 1/2 systems only as type 3 system BITEs do not have any memory) of internal and external faults,
- transmission to the Centralized Fault Display Interface Unit (CFDIU) of internal and external faults for memorization and establishment of the CURRENT LEG REPORT.

This in flight phase corresponds to the Post Flight Report (PFR) recording time (Beginning and end of fault and Electronic Centralized Aircraft Monitoring (ECAM) warning message memorization in the CFDIU).

FLIGHT/GROUND TRANSITION

Transition to ground occurs when, after touch down, the aircraft speed has been below 80 knots for 150 seconds. At this time, the CURRENT LEG REPORT is renamed under the title LAST LEG REPORT and is stored in the PREVIOUS LEGS REPORT.

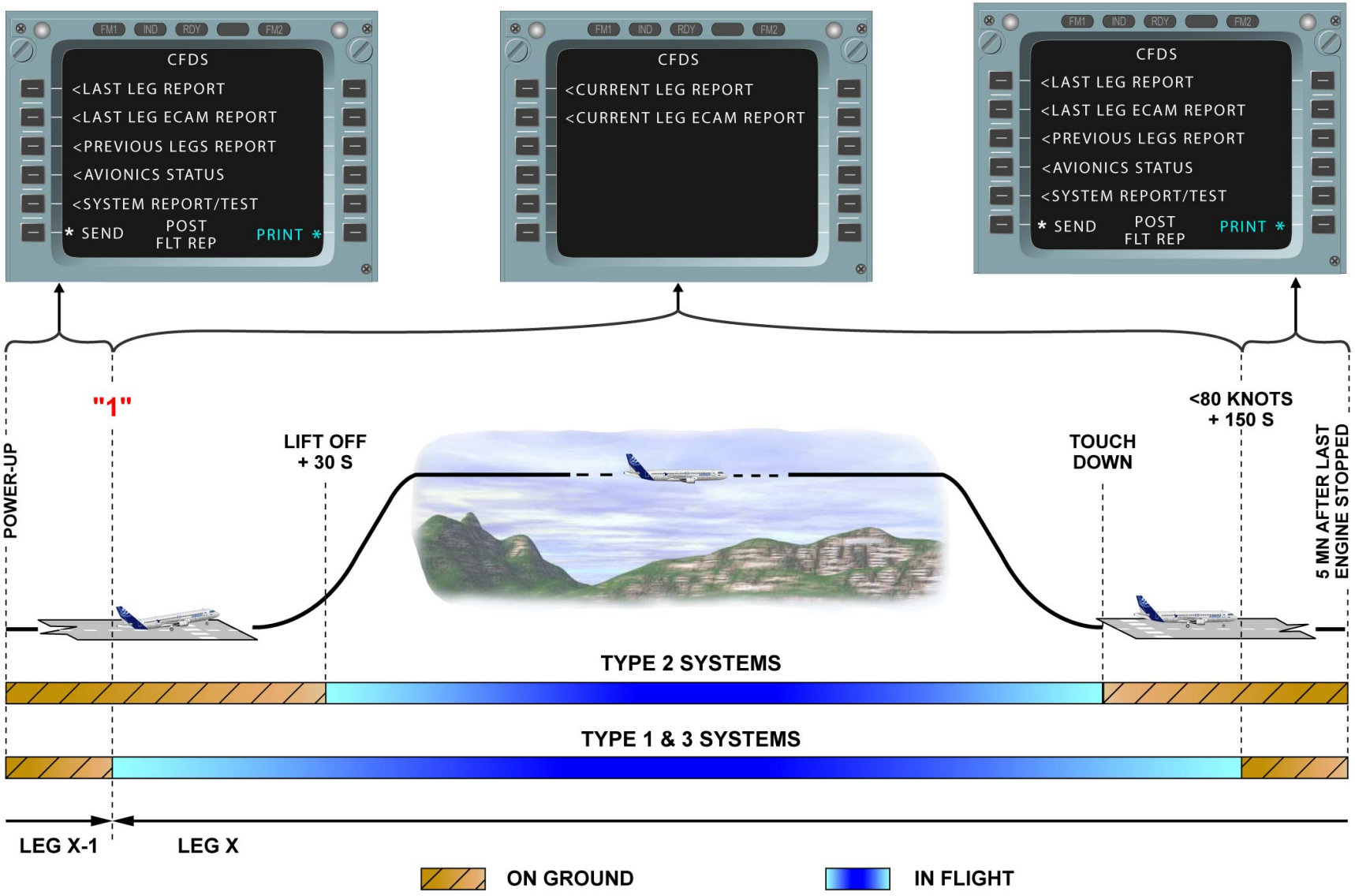
NOTE: As the leg has not changed, the content of the LAST LEG REPORT is identified in the PREVIOUS LEGS REPORT under the LEG -00.

ON GROUND PHASE

On ground, the system BITEs ensure:
- detection (Type 1/2/3 systems) and memorization in their ground memory (Type 1/2 systems) of internal faults only,
- transmission to the CFDIU of internal faults for monitoring and establishment of the AVIONICS STATUS.

All Centralized Fault Display System (CFDS) functions (e.g. PFR printing) are available on request through the MCDUs.

UGB13131 - U7ST0M0 - UM31PA000000001



GROUND/FLIGHT TRANSITION ... ON GROUND PHASE

CFDIU FUNCTIONS (3)

MAIN FUNCTIONS

MEMORY

The Centralized Fault Display Interface Unit (CFDIU) stores the failure messages and the Electronic Centralized Aircraft Monitoring (ECAM) warning messages in a Non Volatile Memory (NVM).

MANAGEMENT

The CFDIU manages failure information and adds data such as Universal Time Coordinated (UTC), DATE, ATA chapter, LEG, FLIGHT PHASE to elaborate reports.

CORRELATION

If a computer internal failure is detected, the CFDIU achieves a correlation function that means it isolates or ignores the malfunctions of systems relating to this failure. Example: ADC FAILURE causes NO DATA FROM ADC in other computers. The Centralized Fault Display System (CFDS) will present only the initial failure in the last leg report. The function IDENT will then present the systems affected by this failure.

MONITORING

The CFDIU scans permanently all input buses in order to detect a transmitted failure message. The CFDIU detects intermittent operation of the systems and adds INTM to the failure message.

DETECTION

The CFDIU can detect the nature of the failure by reading the ARINC words. Nature of failures:
- internal (i.e. SDAC FAULT)
- external (i.e. FWC 1: NO DATA FROM ADIRU1)
- intermittent; (INTM) added
- class 3; (CLASS 3) added.

INTERFACES

CLOCK

The CFDIU permanently receives the UTC and the date from the aircraft clock and then sends these two parameters to all type 1 systems. The UTC and date are used by the system Built-in Test Equipments (BITEs) as well as the CFDIU for the various maintenance reports.

FAC

The CFDIU receives the flight number and city pair from the Flight Augmentation Computer (FAC). The city pair (FROM/TO airport) is sent to the Air Traffic Service Unit (ATSU) and to the Data Management Unit (DMU)-part of the Flight Data Interface and Management Unit (FDIMU). The CFDIU counts the number (maximum 8) of identical and consecutive ECAM warning messages and records in the LAST LEG ECAM REPORT.

FDIMU

The CFDIU receives the aircraft identification from the Flight Data Interface Unit (FDIU)-part of the FDIMU and sends this parameter to all type 1 systems. The CFDIU is used as an interface between the FDIU part and the Flight Warning Computer (FWC) to send some FDIU class 2 failures to the FWC in order to constitute the maintenance status.
The CFDIU is used as an interface between the DMU-part of the FDIMU and the FWC to send some DMU class 2 failures. DMU class 2 failures are used for the maintenance status on the ECAM.

FWC

The CFDIU receives the flight phases and ECAM warnings from the FWC. The ECAM warnings are used by the CFDIU to generate the LAST or CURRENT LEG ECAM REPORT. Only PRIMARY

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failures, INDEPENDENT failures and CLASS 2 failure messages (Maintenance status) are received.

DMC

The CFDIU receives the engine serial number from the Display Management Computer (DMC) and sends this parameter to the Engine Vibration Monitoring Unit (EVMU).

ATSU

The ATSU receives the city pair from the FAC through the CFDIU. The CFDIU can send real time failures and ECAM warning messages to the ATSU. It can also send the Post Flight Report (PFR) to the ATSU at the end of the flight.

EVMU

The EVMU receives the engine serial number from the DMC through the CFDIU. The DMC receives it from the Engine Control Unit (ECU) for CFM engines, or Electronic Engine Control (EEC) for IAE and PW engines.

ABNORMAL OPERATION

CLOCK BACKUP

If the aircraft clock fails, the CFDIU takes over and its internal clock sends UTC and date on the output bus to all type 1 systems. Upon power-on after A/C clock failure, the item GMT/DATE INIT is added to the CFDS menu. This option enables UTC and date initialization.

CFDIU FAILURE

When the CFDIU is affected by an internal failure, the message CFDIU is displayed on the ECAM MAINTENANCE STATUS page.

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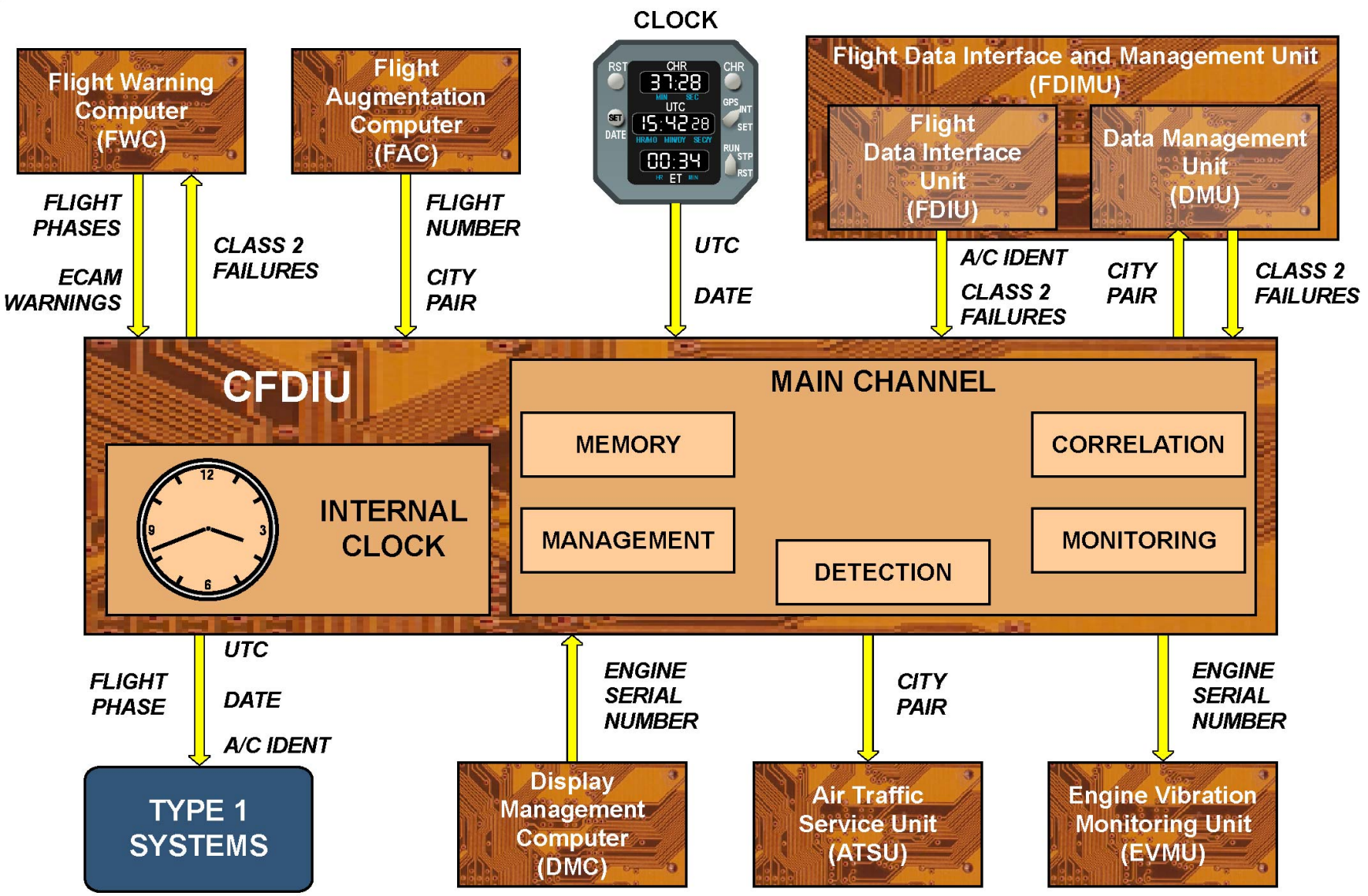

MAIN FUNCTIONS ... ABNORMAL OPERATION

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TROUBLE SHOOTING PROCEDURE WITH CFDS (3)

COCKPIT EFFECT

After a malfunction, the crew reports the cockpit effect in the log book. The fault symptoms, relative to the cockpit effect, can be as follows:
- a WARNING/MALFUNCTION + Centralized Fault Display System (CFDS) FAILURE message (with possible associated warnings and system IDENTIFIERS).
- a WARNING/MALFUNCTION alone.
- a CFDS FAULT message alone.

PFR

For the class 1 and 2 failures of CFDS monitored systems, the Post Flight Report (PFR) permits an access to the concerned list of faults in Airn@v. For this purpose, it gives the following information: WARNING/MAINT status messages (if it exists), FAILURE message with its SOURCE, ATA reference and IDENTIFIERS list. When the PFR print is not available, this information can be retrieved through the MCDU (in Normal mode or Menu mode). Service Information Letter (SIL) 00-028, made of "spurious maintenance messages", and the maintenance knowledge let the airlines create a specific data base to filter the messages to be displayed on the PFR. Once loaded into the Centralized Fault Display Interface Unit (CFDIU), this maintenance filter data base can be activated through the MCDU.

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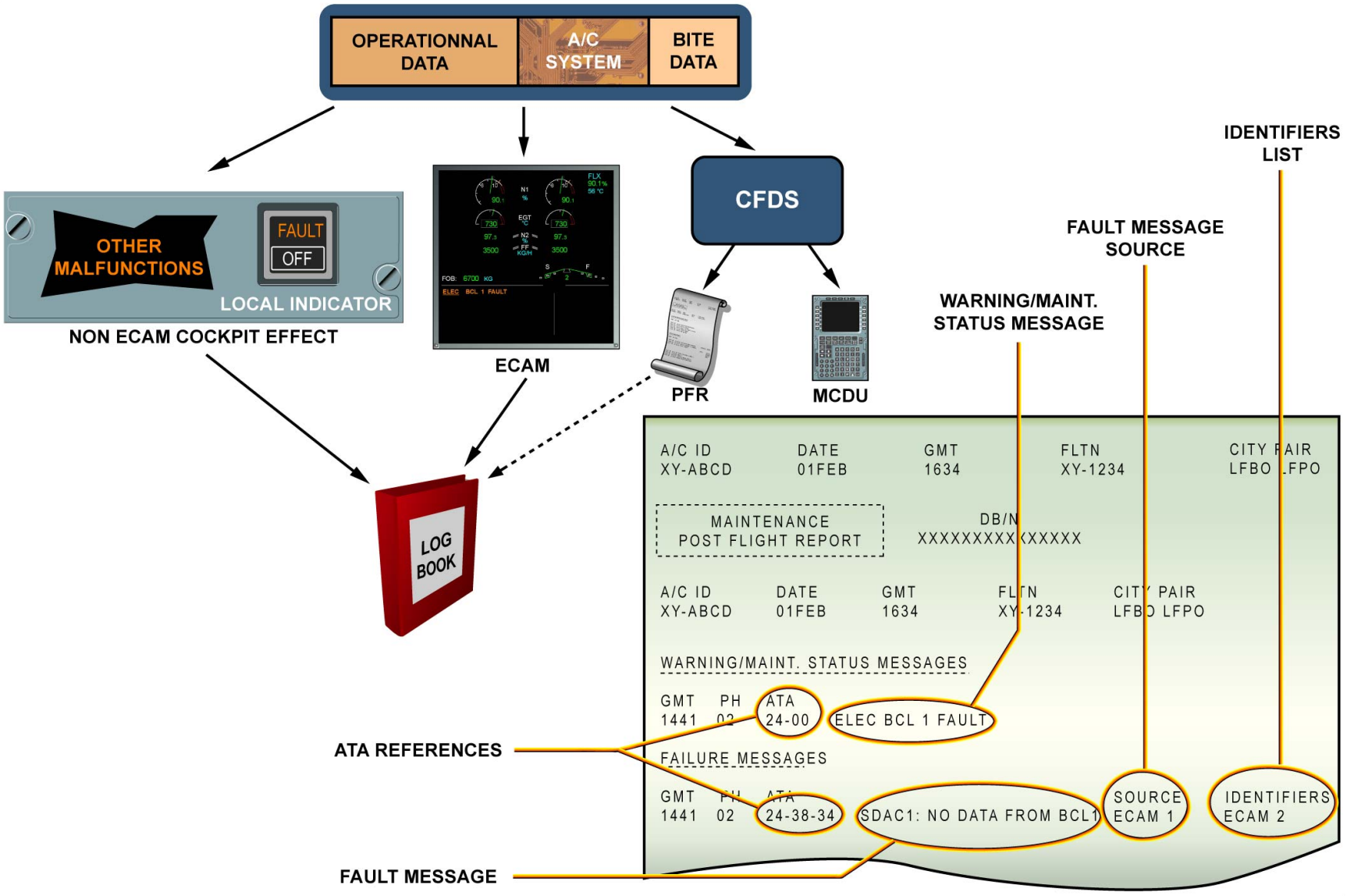


COCKPIT EFFECT & PFR

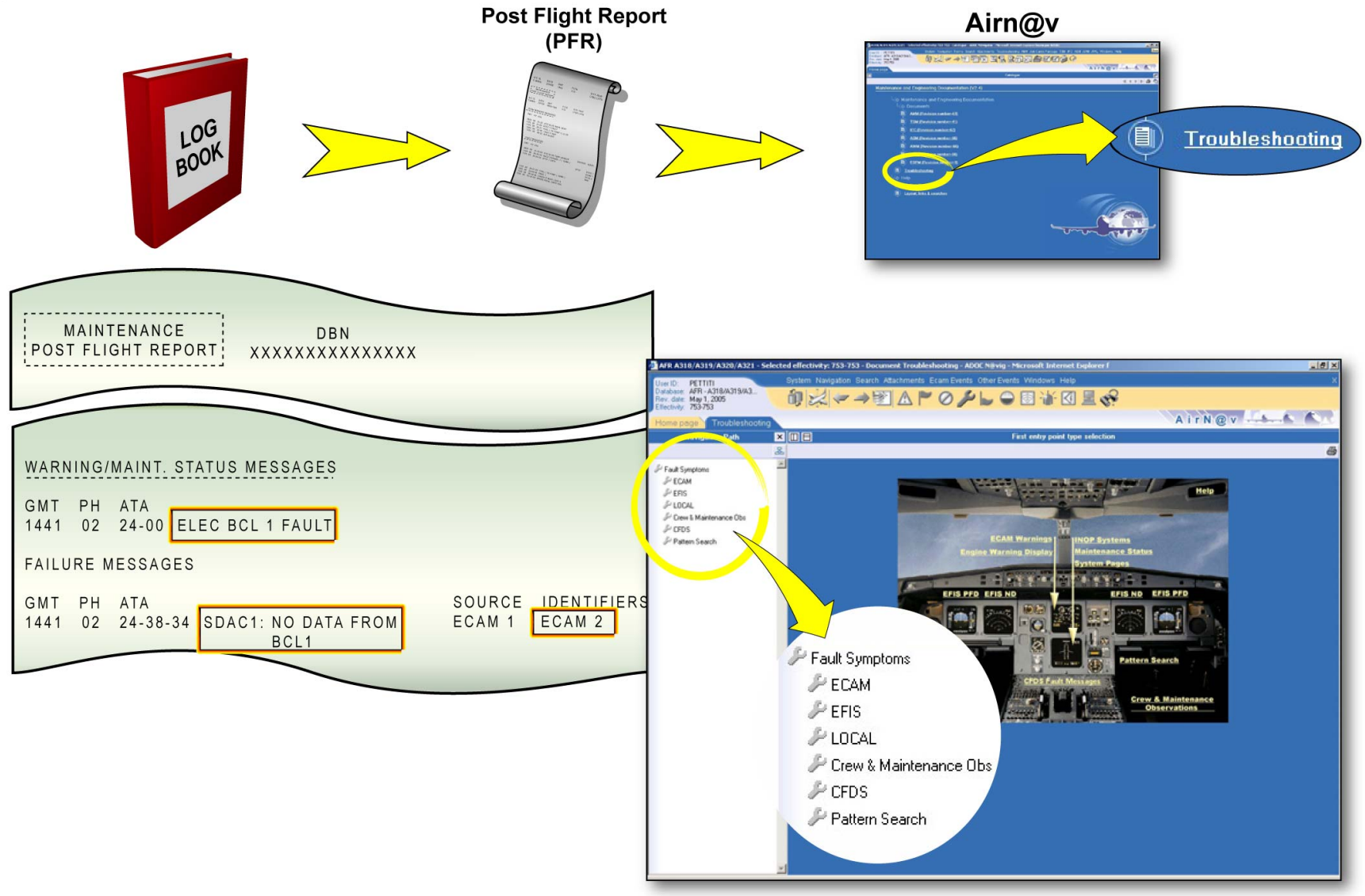
TROUBLE SHOOTING PROCEDURE WITH CFDS (3)

TROUBLE SHOOTING PROCESS

AIRN@V ENTRY

The CFDS report information gives a direct access to the fault isolation procedure task numbers through Airn@v. You have to select the Troubleshooting documentation to get access to the fault symptoms, which are the association of a warning/malfunction and/or CFDS fault message. The fault symptoms are divided into the five following sections:

- ECAM,
- Electronic Flight Instrument System (EFIS),
- LOCAL warning,
- Crew & Maintenance Observation and,
- CFDS.



TROUBLE SHOOTING PROCESS - AIRN@V ENTRY

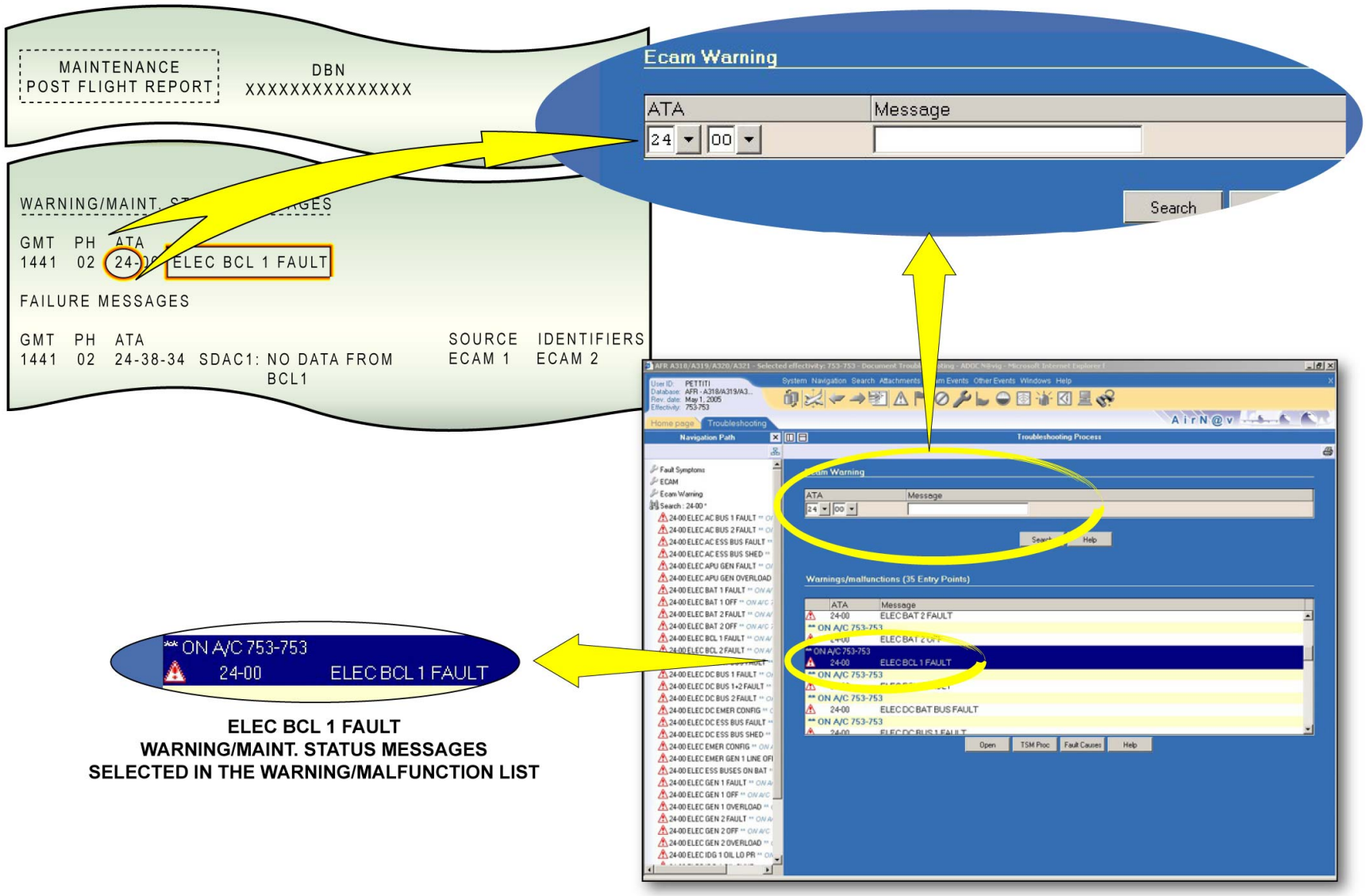
TROUBLE SHOOTING PROCEDURE WITH CFDS (3)

TROUBLE SHOOTING PROCESS (continued)

WARNING/MAINT. SELECTION

To find the reported problem (ELEC BCL 1 FAULT in this example), you have to select ECAM Warning and enter the name of the WARNING/MAINT. STATUS MESSAGES, which appears on the PFR (or on the ECAM Display Unit). You can also enter the ATA chapter to have a list of Warnings/malfunctions, and then you select the related WARNING/MAINT status messages.

NOTE: If required, additional Warnings/malfunctions must be selected.



ELEC BCL 1 FAULT
WARNING/MAINT. STATUS MESSAGES
SELECTED IN THE WARNING/MALFUNCTION LIST

TROUBLE SHOOTING PROCESS - WARNING/MAINT. SELECTION

TROUBLE SHOOTING PROCEDURE WITH CFDS (3)

TROUBLE SHOOTING PROCESS (continued)

CORRELATION

A Warning/malfunction with its correlated CFDS fault could have several associated fault isolation procedure tasks according to the systems, which have detected the fault. The PFR gives a SOURCE item, which must be compared with the SOURCE item of the CFDS Fault messages list in Airn@v. By selecting the appropriate fault message, the Airn@v system gives the right access to the fault isolation procedure.

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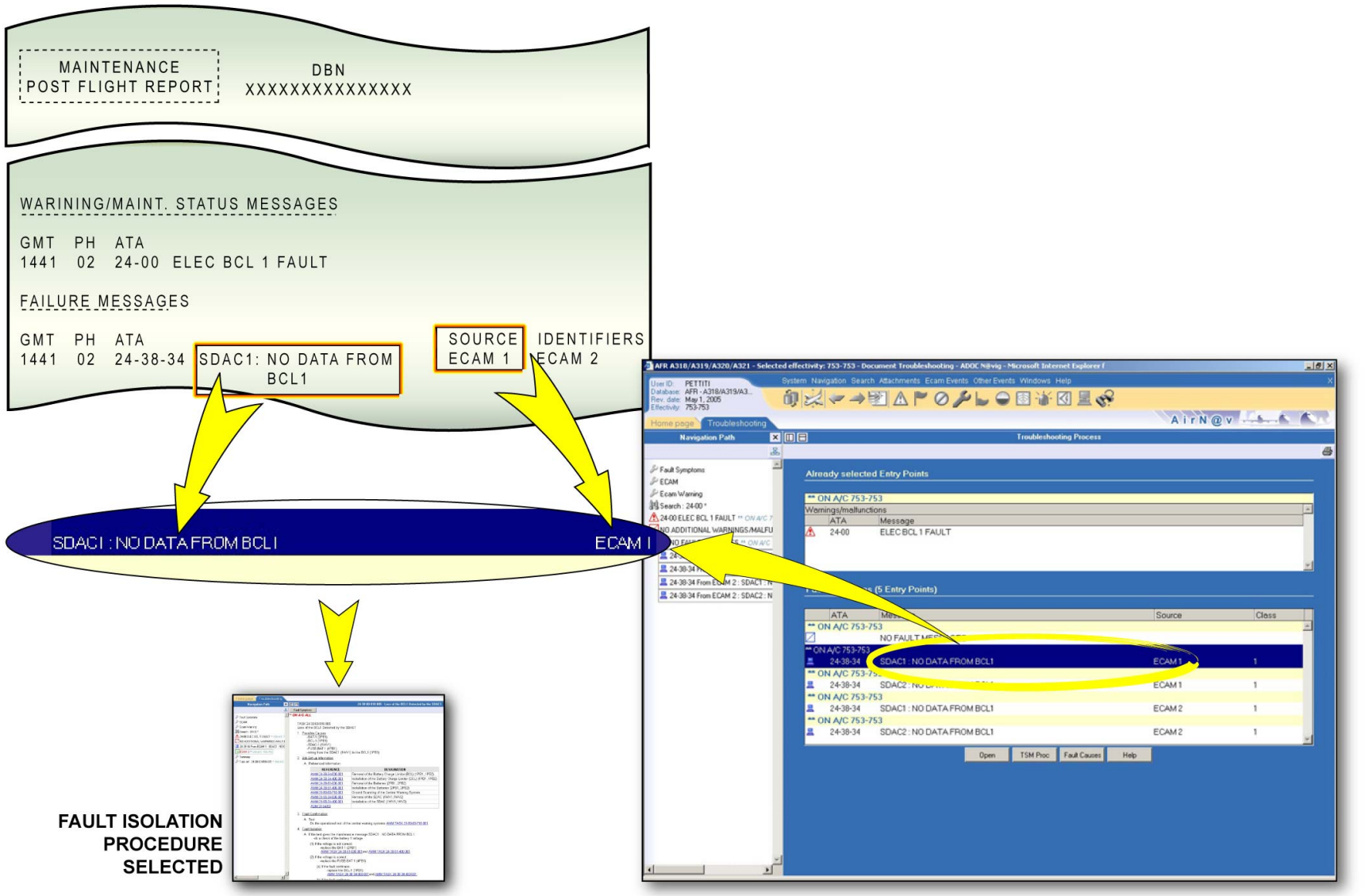

TROUBLE SHOOTING PROCESS - CORRELATION

TROUBLE SHOOTING PROCEDURE WITH CFDS (3)

FAULT ISOLATION PROCEDURE

The related fault isolation procedure task in Airn@v (task number 24-30-00-810-805) has a presentation of possible causes and the fault confirmation (for example by an operational test, power-up test or GROUND SCANNING). It also gives the fault isolation procedure including Line Replaceable Unit (LRU) removal/installation, wiring check, etc.... In addition, the procedure gives access to the useful aircraft documentation references knowing that all manuals contained in AirN@v are interconnected by hyperlinks, and all the schematics can be found and printed easily.

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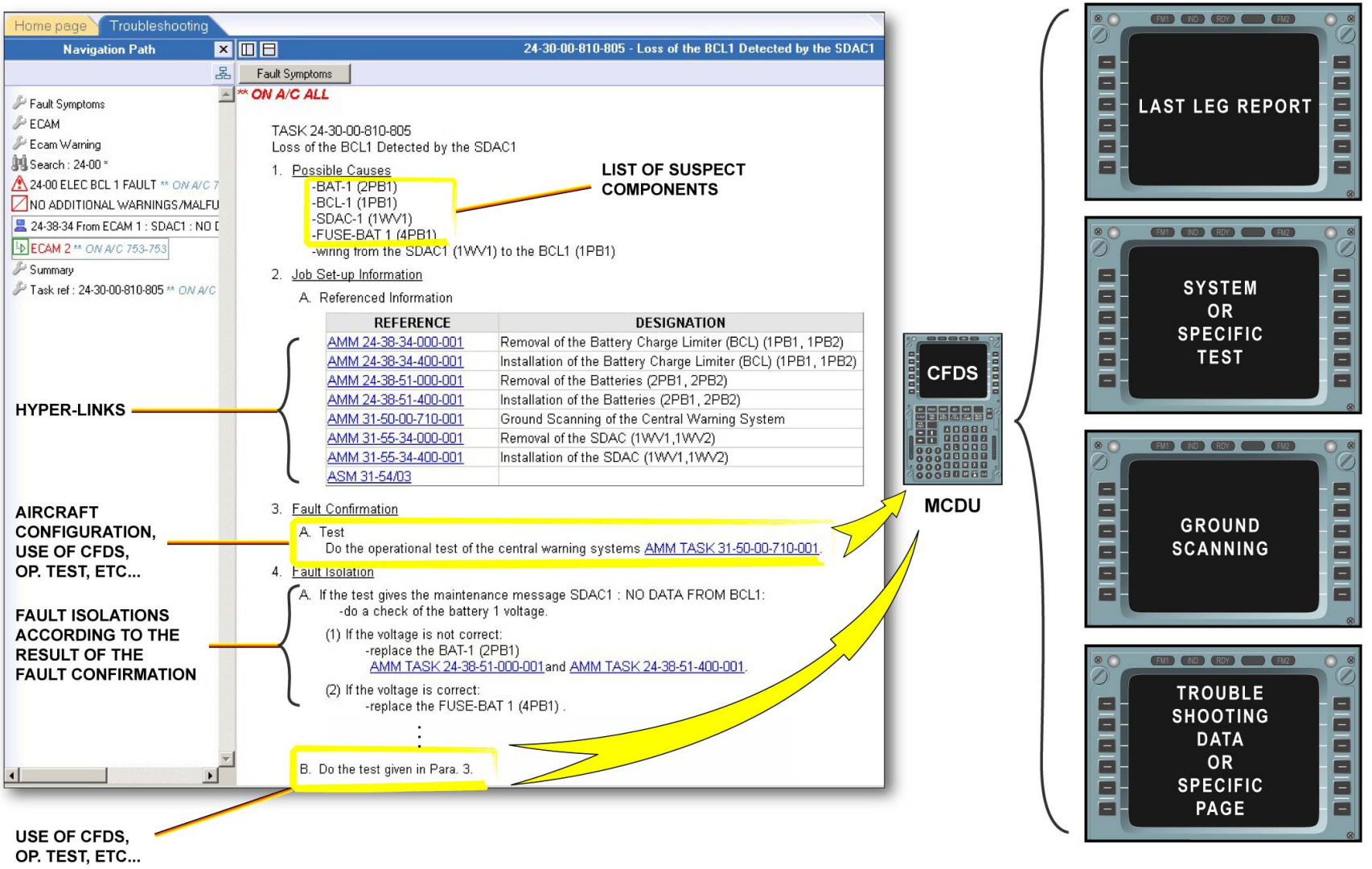
Home page
Troubleshooting
Navigation Path
24-30-00-810-805 - Loss of the BCL1 Detected by the SDAC1
Fault Symptoms
** ON A/C ALL
Fault Symptoms
ECAM
Ecam Warning
Search : 24-00 *
24-00 ELEC BCL 1 FAULT ** ON A/C 7
NO ADDITIONAL WARNINGS/MALFU
24-38-34 From ECAM 1 : SDAC1 : NO D
ECAM 2 ** ON A/C 753-753
Summary
Task ref : 24-30-00-810-805 ** ON A/C
TASK 24-30-00-810-805
Loss of the BCL1 Detected by the SDAC1
1. Possible Causes
-BAT-1 (2PB1)
-BCL-1 (1PB1)
-SDAC-1 (1WV1)
-FUSE-BAT 1 (4PB1)
-wiring from the SDAC1 (1WV1) to the BCL1 (1PB1)
LIST OF SUSPECT COMPONENTS
2. Job Set-up Information
A. Referenced Information
REFERENCE
DESIGNATION
AMM 24-38-34-000-001
Removal of the Battery Charge Limiter (BCL) (1PB1, 1PB2)
AMM 24-38-34-400-001
Installation of the Battery Charge Limiter (BCL) (1PB1, 1PB2)
AMM 24-38-51-000-001
Removal of the Batteries (2PB1, 2PB2)
AMM 24-38-51-400-001
Installation of the Batteries (2PB1, 2PB2)
AMM 31-50-00-710-001
Ground Scanning of the Central Warning System
AMM 31-55-34-000-001
Removal of the SDAC (1WV1,1WV2)
AMM 31-55-34-400-001
Installation of the SDAC (1WV1,1WV2)
ASM 31-54/03
HYPER-LINKS
3. Fault Confirmation
A. Test
Do the operational test of the central warning systems AMM TASK 31-50-00-710-001.
AIRCRAFT CONFIGURATION, USE OF CFDS, OP. TEST, ETC...
4. Fault Isolation
A. If the test gives the maintenance message SDAC1 : NO DATA FROM BCL1:
-do a check of the battery 1 voltage.
(1) If the voltage is not correct:
-replace the BAT-1 (2PB1)
AMM TASK 24-38-51-000-001 and AMM TASK 24-38-51-400-001.
(2) If the voltage is correct:
-replace the FUSE-BAT 1 (4PB1) .
FAULT ISOLATIONS ACCORDING TO THE RESULT OF THE FAULT CONFIRMATION
B. Do the test given in Para. 3.
USE OF CFDS, OP. TEST, ETC...
CFDS
MCDU
LAST LEG REPORT
SYSTEM OR SPECIFIC TEST
GROUND SCANNING
TROUBLE SHOOTING DATA OR SPECIFIC PAGE

FAULT ISOLATION PROCEDURE

POST FLIGHT REPORT FILTERING FUNCTION (3)

PURPOSE

The purpose of the filtering function is to reduce the number of spurious maintenance messages. So the filtered Post Flight Report (PFR) contains only the messages needing a maintenance action.

FILTER DATA BASE CUSTOMIZATION AND LOADING

Using the feedback data from the airlines or the data from laboratory or flight tests, Airbus establishes, keeps up to date and transmits to the airlines a document called Service Information Letter (SIL) 00-028. SIL 00-028 consists of a "spurious maintenance messages data base". This is an envelope data base, including the spurious messages concerning every possible Part Number (PN) from every vendor.
The airline is responsible for customizing this envelope data base to its fleet configuration using a compatible personal computer and dedicated software. The customized maintenance filter data base is first stored on a floppy disk, and then uploaded into the Centralized Fault Display Interface Unit (CFDIU) by means of the data loader.

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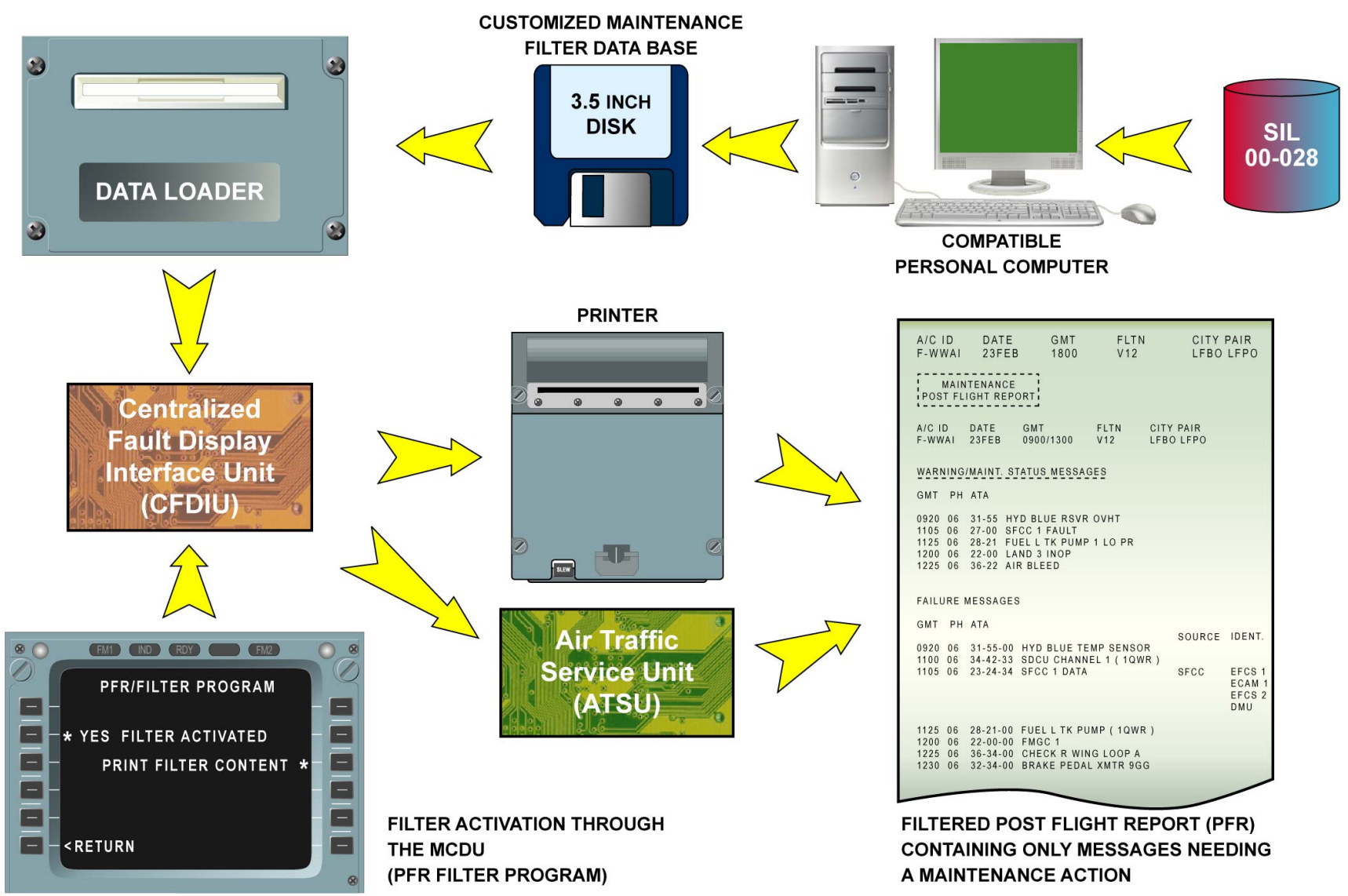


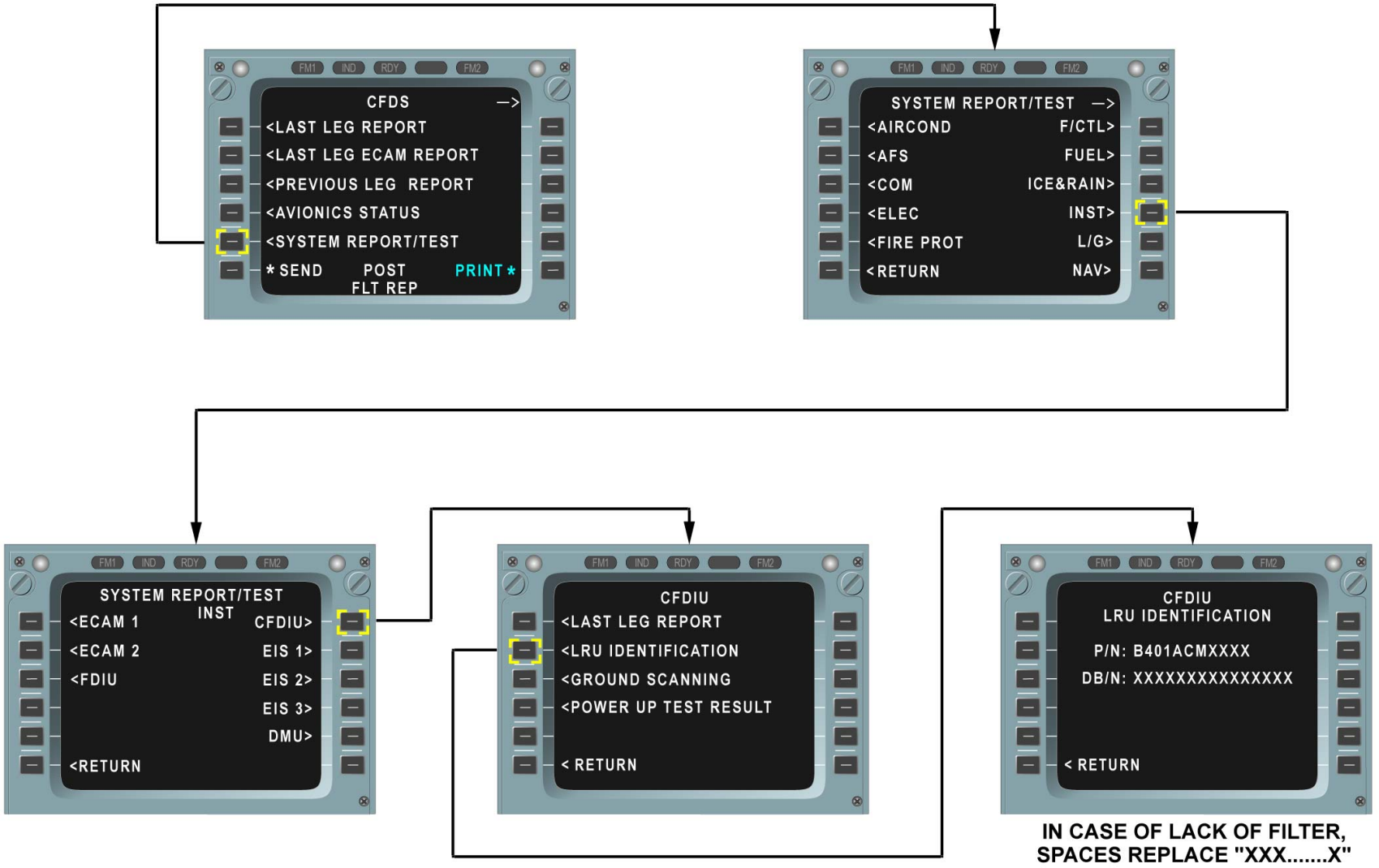
PURPOSE & FILTER DATA BASE CUSTOMIZATION AND LOADING

POST FLIGHT REPORT FILTERING FUNCTION (3)

FILTER DATA BASE IDENTIFICATION

Each filter is identified by a 15-character data base number. The data base number is written on the filtered PFR and can be displayed on the MCDU.

UGB13131 - U7ST0M0 - UM31DA000000001



FILTER DATA BASE IDENTIFICATION

POST FLIGHT REPORT FILTERING FUNCTION (3)

ACTIVATION

The filtered PFR is activated through the MCDU with the function called PFR FILTER PROGRAM.
When FILTER ACTIVATED is set to NO: The complete PFR can be manually or automatically printed or sent through the Air Traffic Service Unit (ATSU).
When FILTER ACTIVATED is set to YES: The filtered PFR can be manually or automatically printed or sent through the ATSU. With the PRINT FILTER CONTENT function, the maintenance filter data base can be printed.

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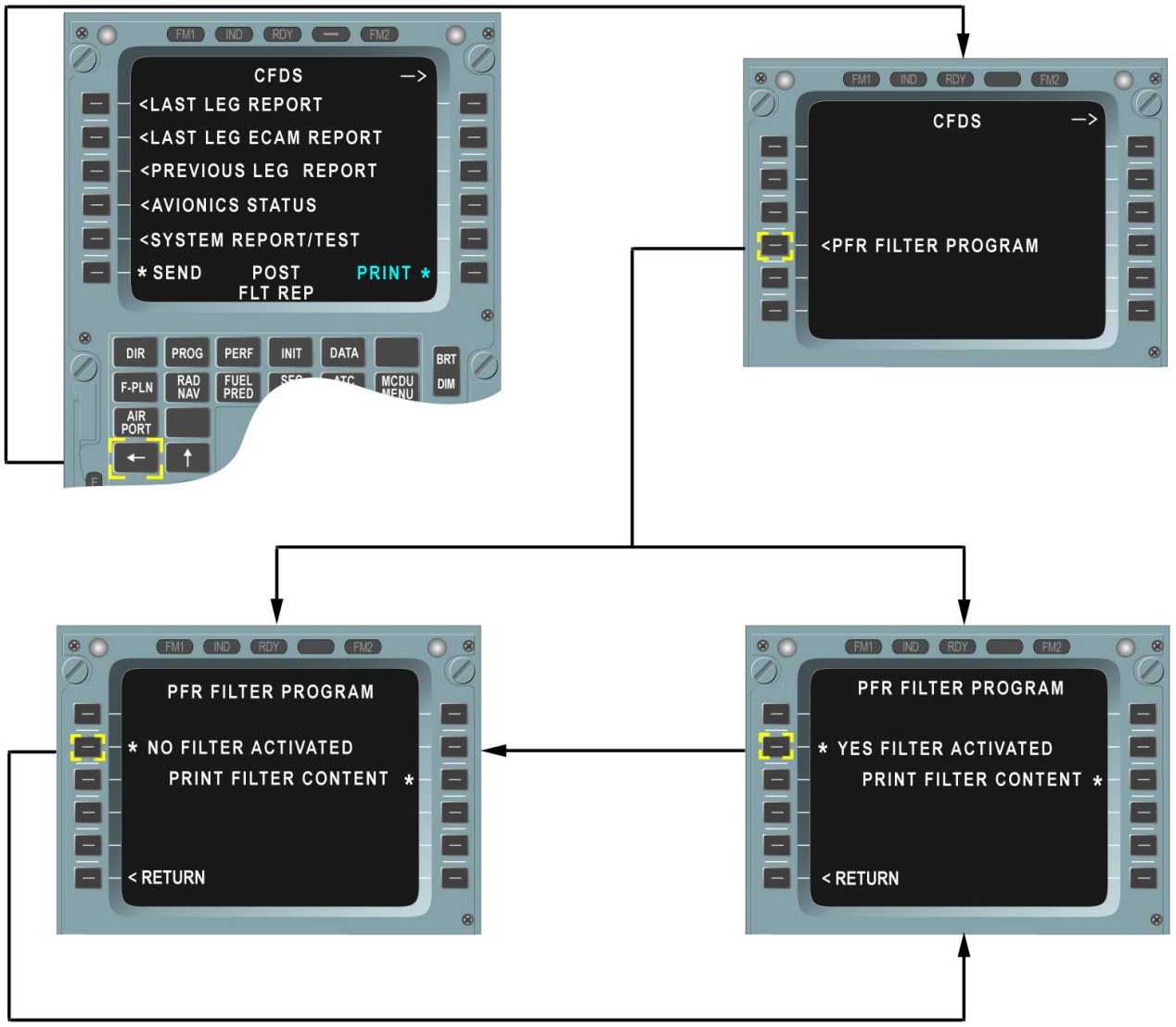
CFDS
<LAST LEG REPORT
<LAST LEG ECAM REPORT
<PREVIOUS LEG REPORT
<AVIONICS STATUS
<SYSTEM REPORT/TEST
* SEND
POST FLT REP
PRINT *
<PFR FILTER PROGRAM
PFR FILTER PROGRAM
* NO FILTER ACTIVATED
PRINT FILTER CONTENT *
< RETURN
* YES FILTER ACTIVATED
PRINT FILTER CONTENT *
< RETURN

ACTIVATION

POST FLIGHT REPORT FILTERING FUNCTION (3)

EXAMPLES

These examples show a PFR not filtered, the maintenance filter data base and the PFR filtered.

UGB13131 - U7ST0M0 - UM31DA000000001

```
A/C ID      DATE       GMT            FLTN              CITY PAIR
F-WWT       05OCT      1537           974               LFBO LFPO

  MAINTENANCE
POST FLIGHT REPORT

A/C ID     DATE     GMT          FLTN       CITY PAIR
F-WWT      05OCT    1351/1509    974        LFBO LFPO

WARNING/MAINT. STATUS MESSAGES

GMT   PH  ATA
1407  05  77-11  ENG 2 FADEC
1455  06  27-00  F/CTL ELAC 2 FAULT
1508  07  27-00  F/CTL SEC 3 FAULT

FAILURE MESSAGES

GMT  PH  ATA                                    SOURCE     IDENT.
1353 03  XX-XX-XX  DME2: NO CTL SOURCE DATA    DME2       ADF 1
1353 03  29-34-11  SDAC1: B HYD AIR PRSS       ECAM 1     ECAM 2
                    XMTR 2385GH
1354 04  29-34-11  SDAC2: B HYD AIR PRSS       ECAM 1     ECAM 2
                    XMTR 2385GH
1354 04  23-73-34  NO CIDS 1 DATA              CFDS
1354 04  26-17-34  NO SDCU 1 DATA              CFDS       ECAM 1
                                                          ECAM2
1354 04  22-66-34  AFS: FAC2                   AFS
1354 04  26-17-34  NO EIU 1 DATA (INTM)        CFDS
1354 04  38-31-34  NO VSC DATA                 CFDS
1407 05  23-XX-XX  VHF2: NO DATA FROM          VHF 2      VHF 3
                    CONTROL SOURCE
1407 05  73-22-52  FMU/HC/EEC2                 EIU2FADEC
1413 06  30-11-51  R WAI FILTER OR VALVE       TEMP CTL
1424 06  31-36-34  NO DMU DATA (INTM)          CFDS
1446 06  31-32-34  RADAR1: NO DATA             RADAR 1
                    FROM CFDIU
1446 06  31-32-34  AFS: ELAC2                  AFS        EFCS 2
1508 07  34-12-34  CHECK ADIRU1 INPUT B /      ADR1       ADR 3
                    SFCC CKT
1508 07  27-93-34  SEC3                        EFCS 1     EFCS 2
```

NOT FILTERED PFR

```
A/C ID      DATE       GMT            FLTN              CITY PAIR
F-WWT       05OCT      1537           974               LFBO LFPO

  MAINTENANCE
FILTER DATA BASE          DB / N
                          XXXXXXXXXXXXXXX

WARNING/MAINT. STATUS MESSAGES

W/N  PH  ATA
01   06
02   06  27-00

FAILURE MESSAGES

F/N  PH  ATA                                          SOURCE
001                                                   DME2
002  03  29-34-11  SDAC1: B HYD AIR PRSS              ECAM 1
                    XMTR 2385GH
003      23
004  04  26-17-34  NO SDCU DATA
005      73-25-34  NO EIU 1 DATA                      CFDS
006      31-36
007  06  27-93-34
008                                                   ADR 1
```

MAINTENANCE FILTER DATA BASE

```
A/C ID      DATE       GMT            FLTN              CITY PAIR
F-WWT       05OCT      1537           974               LFBO LFPO

  MAINTENANCE
POST FLIGHT REPORT        DB / N
                          XXXXXXXXXXXXXXX

A/C ID     DATE     GMT          FLTN       CITY PAIR
F-WWT      05OCT    1351/1509    974        LFBO LFPO

WARNING/MAINT. STATUS MESSAGES

GMT   PH  ATA
1407  05  77-11  ENG 2 FADEC

FAILURE MESSAGES

GMT  PH  ATA                                          SOURCE     IDENT.
1354 04  29-34-11  SDAC2: B HYD AIR PRSS             ECAM 1     ECAM 2
                    XMTR 2385GH
1354 04  22-66-34  AFS: FAC2                         AFS
1354 04  38-31-34  NO VSC DATA                       CFDS
1407 05  73-22-52  FMU/HC/EEC2                       EIU2FADEC
1413 06  30-11-51  R WAI FILTER OR VALVE             TEMP CTL
1446 06  31-32-34  RADAR1: NO DATA                   RADAR 1
                    FROM CFDIU
```

FILTERED PFR

EXAMPLES

PRINTER DESCRIPTION/OPERATION (3)

PRINTER CAPABILITY

The printer provides onboard printouts concerning various aircraft systems one at a time. The printer is capable to print 80, 64 or 40 characters per line format. It provides a storage capability of 8 Kilobytes (Kb) and is able to generate 120 forty-character lines per minute.

USERS

Data to be printed is formatted within the various system users. The printer determines which input is active and switches on each system in order of their priorities.

MANUAL PRINT

In manual mode, prints are triggered from the MCDU. The MCDU initiates printing of data displayed on MCDU screen or data stored in system reports.

AUTOMATIC PRINT

Some reports are automatically printed provided that the automatic printing function has been programmed in the corresponding system computer.
Example: Automatic printing of the Centralized Fault Display System (CFDS) POST FLIGHT REPORT upon engine shutdown.

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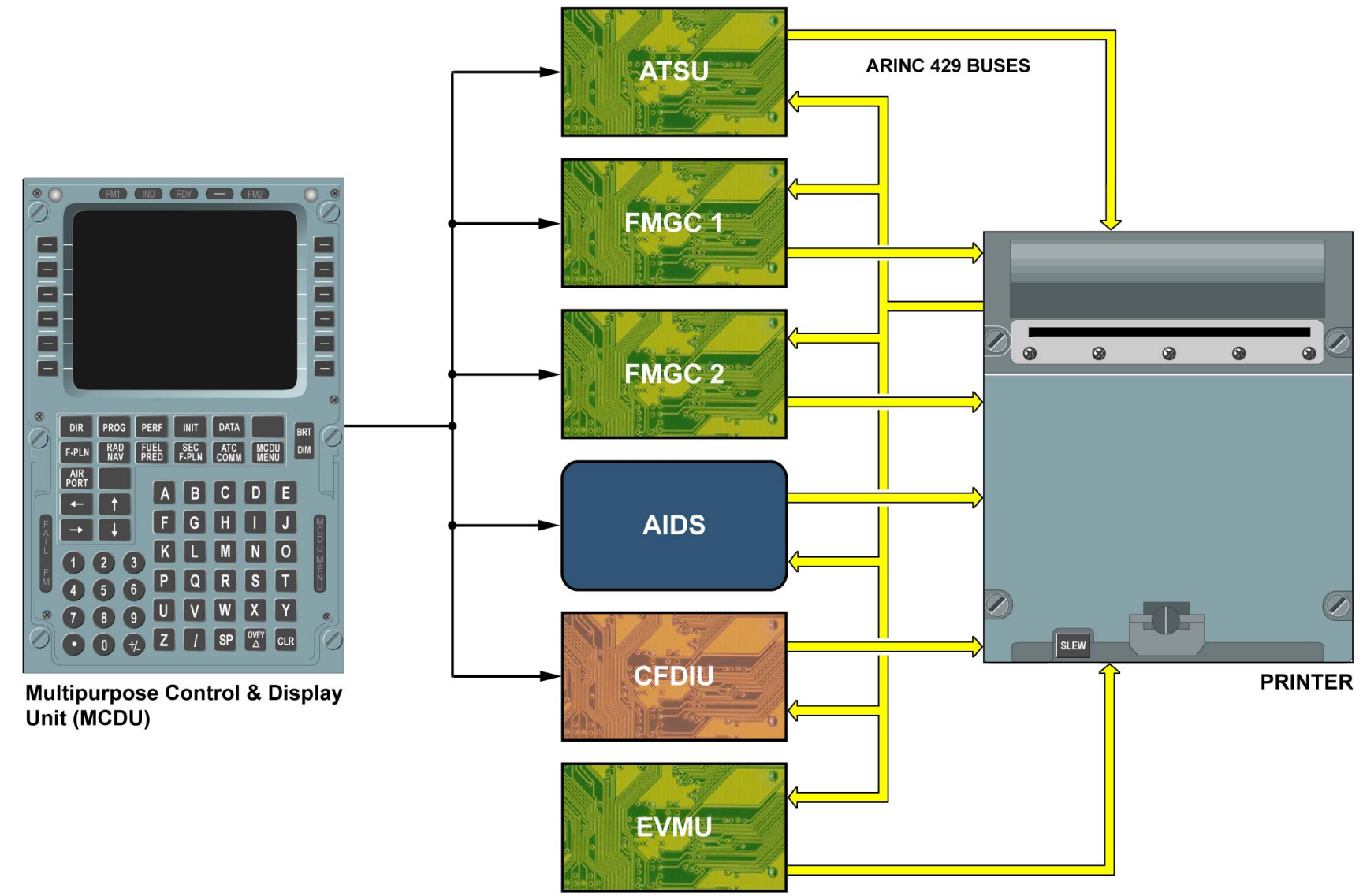

PRINTER CAPABILITY ... AUTOMATIC PRINT

PRINTER PAPER LOADING (2)

JOB SET-UP

Energize the aircraft electrical circuits.
Push the SLEW P/BSW to remove the remaining paper from the printer.

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Servicing of the Printer

Job set-up

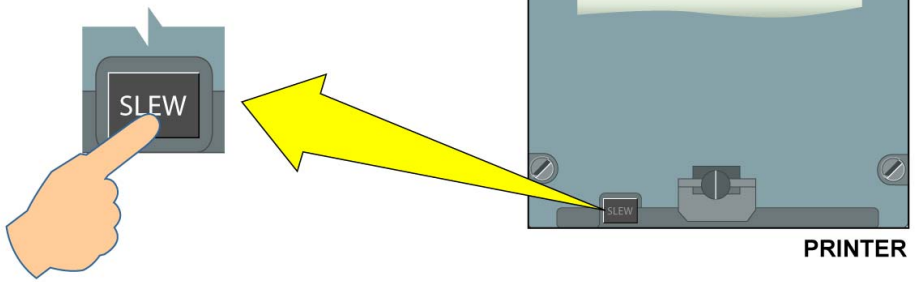
Push the SLEW pushbutton switch to remove the remaining paper from the printer.

Procedure

Servicing of the Printer:

Close-up

A red stripe on the paper side indicates end of roll.



JOB SET-UP

PRINTER PAPER LOADING (2)

PROCEDURE

Turn the locking system to release the door.
Lift the door and discard the empty roll.
Clean the remaining paper off the paper cutter.
Install a new roll of paper on its support and check that the paper roll turns correctly.
Engage the paper under drive roller and check that paper is held tight.
Close and lock the printer door.

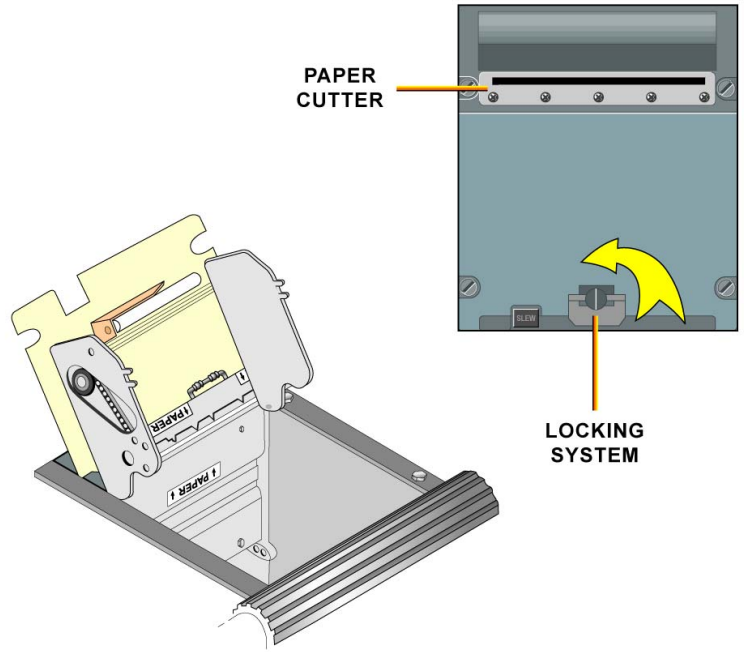
Servicing of the Printer

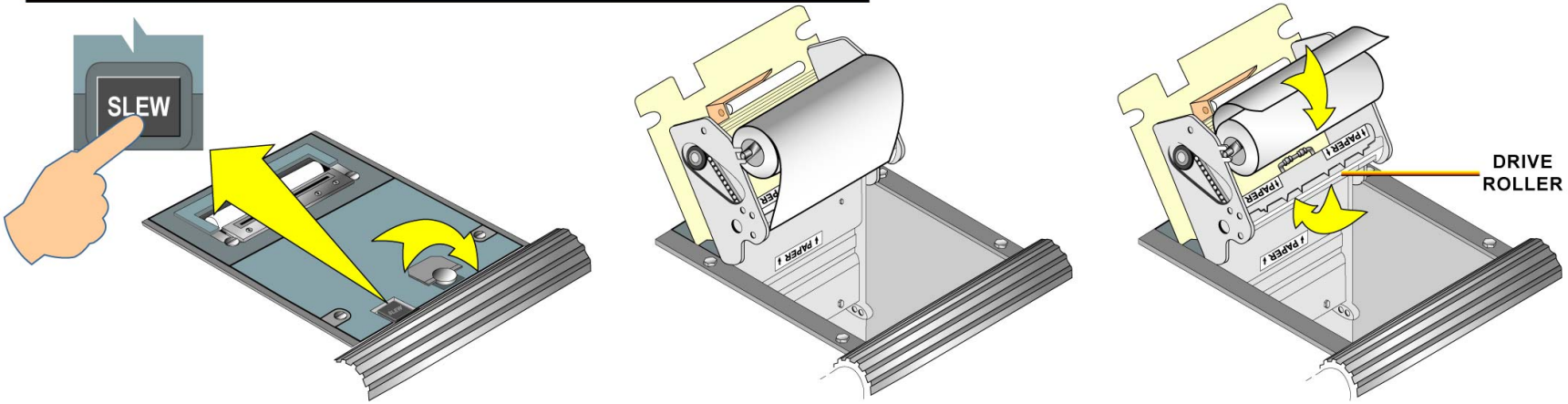
✓ **Job set-up**

Procedure

Servicing of the Printer:
(1)Release the door with the locking system.
(2)Lift the door.
(3)Move the empty roll from the right to the left to disengage it from its support.
(4)Clean the remaining paper off the paper cutter.
(5)Install the new roll of paper on its support.
(6)Manually engage the end of the paper under the drive roller.
(7)Close the door.
(8)Lock the door with the locking system.
(9)Push the SLEW pushbutton switch to move the paper out of the slot of the paper cutter.
(10)Use the cutter to remove unwanted paper.

Close-up





PROCEDURE

PRINTER PAPER LOADING (2)

CLOSE-UP

De-energize the aircraft electrical circuits.
Make sure that work area is clean and clear of tools and other items.

NOTE: Using the SLEW P/B move the paper out of the slot of the paper cutter and cut off the unwanted paper.

UGB13131 - U7ST0M0 - UM31Y1000000001

Servicing of the Printer

- ✓ Job set-up
- ✓ Push the SLEW pushbutton switch to remove the remaining paper from the printer.

Procedure

- ✓ Servicing of the Printer:
- ✓ Close-up

TASK COMPLETED

A paper roll allows a 90 feet printing.

CLOSE-UP

COMPUTER REMOVAL AND INSTALLATION (3)

Computer removal/installation

Before starting a computer removal/installation procedure, the A/C has to be set-up for maintenance. The first task is to make sure that the ground service network is energized and the access door is open and accessible. Then make sure that the C/Bs listed in the removal of the computer procedure of Aircraft Maintenance Manual (AMM) is open. The first action is to loosen the nut and then to lower the nut. When the nut is lowered, pull the computer on its rack to disconnect the electrical connectors and remove the computer from its rack. Before starting a computer installation procedure, clean and do a visual inspection of the component interface and of the adjacent area. First remove the blanking caps from the electrical connectors and make sure that the electrical connectors are clean and in the correct condition. Then install the computer on its rack and push it on its rack to connect the electrical connectors. Now you can engage the nuts on the studs and tighten them. The installation is finished. You can close the C/B. The last actions of the computer installation are to do a test through the MCDU and to close the access. Make sure that the work area is clean and clear of tools and other items, close the access door and remove the access platform.

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COMPUTER REMOVAL/INSTALLATION

PUSHBUTTON REMOVAL AND INSTALLATION (3)

Pushbutton removal and installation

Before starting a P/B removal installation procedure, make sure that the lamp capsule is in the delatched (up) position when you remove it from an alternate action switch. If the lamp capsule is not delached (up) when you remove it the switch cannot operate. Then open the C/B of the circuit related to the P/BSW. Put the removal tool lamp capsule extractor in the notches on the side of the head of the P/BSW. Carefully pull the tool to remove the head of the P/BSW. The head stays attached to the body of the P/BSW by the rods that turn. Now you have to remove the body of the P/BSW. First, fully loosen the two screws of the body but do not lock them. After, pull the head to remove the body. Before starting the installation of a P/BSW, clean and make an inspection of the component interface and of the adjacent area. Now, put the TOP mark in the up position and push the body of the P/BSW fully into its housing. Torque the two screws of the body of the P/BSW. Now, install the head in the body of the P/BSW. To do this, push the head until it touches the stop. To finish the installation task close the C/B of the circuit related to the P/BSW. After that, make sure that the work area is clean and clear of tools and other items.

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PUSHBUTTON REMOVAL AND INSTALLATION

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